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Pt 9/2

PATENTS FOR INVENTIONS.

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# ABRIDGMENTS

OF

# Specifications

RELATING TO

# WATCHES, CLOCKS, AND OTHER TIMEKEEPERS.

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PART II.—A.D. 1857–1866.

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# PREFACE.

The Indexes to Patents are now so numerous and costly as to render their purchase inconvenient to a large number of inventors and others, to whom they have become indispensable.

To obviate this difficulty, short abstracts or abridgments of the Specifications of Patents under each head of Invention have been prepared for publication separately, and so arranged as to form at once a Chronological, Alphabetical, Subject-matter, and Reference Index to the class to which they relate. As these publications do not supersede the necessity for consulting the Specifications, the prices at which the printed copies of the latter are sold have been added.

The number of Specifications from the earliest period to the end of the year 1866, amounts to 59,222. A large proportion of the Specifications enrolled under the old law, previous to 1852, embrace several distinct inventions, and many of those filed under the new law of 1852 indicate various applications of the single invention to which the Patent is limited. Considering, therefore, the large number of inventions and applications of inventions to be separately dealt with, it cannot be doubted that several properly belonging to the group which forms the subject of this volume have been overlooked. In the progress of the whole work such omissions will, from time to time, become apparent, and be supplied in second or supplemental editions.

This volume is a continuation of the "Abridgments of "Specifications relating to Watches, Clocks, and other "Timekeepers," already published, and brings the Abridgments to the end of the year 1866. From that date the Abridgments have not been published in classes, but will be found in chronological order in the quarterly volumes of the "Chronological and Descriptive Index" (*see* List of Works at the end of this book). It is intended, however, to publish these Abridgments in classes as soon as the Abridgments of all the Specifications from the earliest period to the end of 1866 have appeared in a classified form. Until that takes place, the reader (by the aid of the Subject-matter Index for each year) can continue his examination of the Abridgments relating to the subject of his search in the Chronological and Descriptive Index.

The present series of Abridgments contains those inventions in which clockwork is employed to indicate time, either by visible or audible means, or in which horological apparatus is actuated by other means than clockwork. Compound instruments, one part of which is a watch or clock (for instance, where a barometer, compass, thermometer, and clock are placed together for facility of reference) have been admitted; but not mathematical instruments used in conjunction with a stop watch for the registration of certain times or isolated periods of time, in order to ascertain speed, or for similar purposes. Inventions relating to all the following subjects are included:—The separate parts of a watch or clock, and the tools for manufacturing the same; scales for a new division of time; time teachers; toy watches; and swivels, bows, pendants, or knobs, when intended to form part of a watch or watch-key, but not when described only as part of a chain, watch guard, or property protector. Inventions relating to the following subjects (excepting a few which also belong to some of the above included classes) are excluded from this work :—Tell-tales and indicators for recording the arrival of workmen, &c.; nautical and astronomical instruments by which time can be ascertained through celestial observations; clockwork mechanism as a part of various machines, wherein it has no reference to the separate and distinct indication of time horologically, but is used mainly as a motive-power, moving by means of regulating apparatus at a determined and uniform speed—for example, in electric telegraph transmitting or receiving machines, musical instruments, and machines performing certain actions at fixed intervals, often styled "automatic."

The Abridgments marked thus (* *) in the following pages were prepared for another series or class, and have been transferred therefrom to this volume.

B. WOODCROFT.

*May*, 1871.

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# WATCHES, CLOCKS, AND OTHER TIMEKEEPERS.

## 1857.

### A.D. 1857, February 10.—Nº 389.

**WATSON, John Forrest.**—Constructing an outer case for a watch. The case consists of a ring, round which is made a rib or projection, which forms a rest for a circular enlargement or flange on the inner case, which, when placed there, is held fast by a bolt or catch or other suitable fastening. On the ring is hinged at one side a metal back, and at the other an open ring. The watch can be placed either with its face or back to the open ring, so as to form an ordinary or a hunting watch. The handle or pendant is fixed on the outer case.

[Printed, 6*d*. Drawing.]

### A.D. 1857, February 20.—Nº 501.

**GLOVER, Joseph, and BOLD, John,** the younger.—Printing by photographic means on substances suitable for dials and tablets.

Enamelled glass, metals, or other suitable mineral substances are operated upon in the following manner:—The surface of the material is first washed with fluoric acid to destroy the gloss, and then with water. The material thus prepared is ready to receive the collodion or other sensitive substance, and to be subjected to the ordinary photographic operations of receiving the image, and developing and fixing the same. "Translucent or transparent "tablets and dials may be taken on glass or other transparent, "semi-transparent, or opaque substances by the above process. "By thus preparing the enamelled or other surface, pictures or "subjects printed thereon are rendered capable of receiving water "colors, oil colors, dry colors, and varnish colors."

[Printed, 4*d*. No Drawings.]

### A.D. 1857, March 9.—N° 674.

**PHILCOX, George.**—"Improvements in marine and pocket "chronometers and other timekeepers."

"This invention consists of a particular train of wheels "applicable only to the two-day marine chronometer and one-"day pocket chronometer;" "also a detent passing through from "back plate to motion work, with pinion fixed on pivot to work "in minute wheel, in order to set the hands of time piece without "opening the case."

The drawings show the said train of wheels adapted to "a "marine chronometer with double cylindrical spring," as described in No. 11,177 (A.D. 1846); the balance and escapement described in No. 730 (A.D. 1852) are also shown.

"The application of the detent to cabin timekeepers is of great "utility, inasmuch as you can by that means set the hands with-"out opening the face of the timekeeper."

[Printed, 6*d*. Drawing.]

### A.D. 1857, March 11.—N° 702. (* *)

**JONES, Robert Lewis.**—"Improvements in regulating clocks "by electricity."

In this invention clocks are regulated "by combining or con-"necting a standard or regulating clock with one or more sub-"sidiary clocks in such manner that a current of electricity is "transmitted at regular intervals by the standard clock, and made "to retard or accelerate the motion of the pendulum or balance "of the subsidiary clock or clocks when necessary, so as to cause "it or them to keep time with the standard or regulating clock, "such subsidiary clocks being complete clocks, and capable of "going independently of the standard or regulating clock."

In applying this invention to pendulums, the "pendulum bob "may consist of a coil of wire which is traversed by the electric "current, and which passes around or over a magnet or magnets "during its oscillations; or the coil or coils may be fixed and the "magnet or magnets attached to the pendulum." The drawings show various ways of completing the electric circuit by the standard pendulum, so as to transmit currents either every second or every two seconds.

This mode of regulating may also be applied to balance clocks in a similar manner.

If the clock pendulum or balance be behind the standard pendulum, the moving coil is drawn further on to the fixed magnet, and the motion of the pendulum or balance accelerated. On the other hand, if the pendulum or balance be in advance of the standard pendulum, the coil is retained on the magnet, and the motion of the pendulum or balance retarded.

[Printed, 10*d*. Drawing.]

### A.D. 1857, March 17.—N° 751.

**ANQUETIN, MODESTE.**—"An improved traveller's watch."

This apparatus serves, "either by means of two dials (each "consisting of hour and minute circles), one of which dials is "movable and adjustable, or by means of two systems of hands, "one of which is movable and adjustable, to indicate the exact "hour in any two localities whatever at the same time."

The Provisional Specification sets forth the invention as comprised in the above summary, and describes an index showing the difference of time at different places.

The Final Specification, besides the above summary, describes various means of moving the extra circles, in order that they may be so adapted to the hands as to indicate the time at the distant place. In one case, a "barret" or cock sustains certain sunken wheels that are turned by means of the button of the pendant, a bevil-gear connection being used. In another instance, the outside wheel (or movable minute wheel) is moved directly by means of a pinion on the button, and the requisite reduction of speed is conveyed to the hour wheel by the interposition of two pinions pivoted on the fixed dial.

A dial containing the relative time-position of certain places communicates its motion to its pair of hands by spur wheels connected by an intermediate wheel. This arrangement is mounted as a portable clock.

[Printed, 8*d*. Drawing.]

### A.D. 1857, May 22.—N° 1440.

**DRUKKER, MEYER.**—"Improvements in apparatus for indi"cating the passage of time."

This invention relates to a method of indicating the passage of time, by means of a shadow passing over a scale, the shadow being caused by a moving light connected with the weight of a clock or other timekeeper.

Upon the paper or other scale, "certain spaces are marked off " to represent hours and parts of hours, corresponding with the " distances which the weight that gives motion to a clock or " time-keeper descends in certain times." A portion of the weight may be formed as a vessel, called a "light-holder," or the " light-holder" may be attached to the weight by any convenient means. A night light is preferred for use in the light-holder.

The scale having been fixed upon the wall, care being taken that the weight or light-holder shall pass before it (the scale), if used with reflected light, or behind it if used with transmitted light, "the lamp in the light-holder is lighted, and the clock " wound up until the top of the shadow cast by the light-holder " upon the scale coincides with the hour shown upon the face of " the clock." The weight of the clock gradually descends, when the clock is in motion, and the hour is correctly indicated by the position of the shadow upon the scale.

[Printed, 4*d*. No Drawings.]

### A.D. 1857, May 30.—N° 1524. (* *)

**CLARK, William Stettinius.**—(*A communication.*)—(*Provisional protection only.*)—"Improvements in machinery for the " manufacture of an instrument for sharpening watch-cleaning " sticks used by watchmakers, said instrument being also ap- " plicable to the sharpening of small wooden cylinders for other " purposes, such as lead pencils, &c." The "sharpener" consists of a hollow cone of metal, open at the base, and having a handle at the top. A steel blade extends from the top to the base; there is a slot under its cutting side. When a pencil is introduced into the sharpener and turned round, the blade will plane it to a fine point. The slot enables the shavings to escape. The invention relates to an improvement in the apparatus for casting the above-described sharpener, and consists in the arrangement of a gauge for the purpose of varying the depth to which the edge of the blade shall be placed in the core of the mould before casting, and of a spring holder and sliding plates which hold the blade in the mould and form the slot by shutting off the composition from the front edge of the blade.

[Printed, 6*d*. Drawing.]

### A.D. 1857, May 30.—N° 1536.

**SHERRATT**, THOMAS.—(*Provisional protection only.*)—"Im-" provements in timekeepers."

"This invention relates chiefly to the application to time-" keepers of a globe, by the rotation of which on its axis the " time of day on various parts of the earth's surface may be " indicated." There are several modifications, but it is preferred, " to mount the globe on the arbor which carries the hour hand, " and in place of the ordinary clock face to apply a face graduated " to twenty-four hours." The speed of the hour hand arbor is reduced " so that it may complete one rotation in every twenty-" four hours." A pointer is attached to the globe or to its axle, and moves round therewith. The said pointer " passing over the graduations on the face of the timekeeper, will indicate the hour " at the place for which the timekeeper is set, and the longitude " lines of the globe will shew by their coincidence with other divi-" sions on the graduated face, the hour at other and distant parts " of the world." A pointer is provided to facilitate the reference to the divisions with which the longitude lines coincide at a given amount. The said pointer slides " in an annular groove concen-" tric with the ring of graduations," and guides " the eye from " the lines on the globe to the graduations." The same effect may be accomplished by means of an adjustable indicator on the axis of the globe. The equator of the globe may be used instead of a graduated face; either the equator may rotate before a fixed style, " or the globe may be fixed and the style be caused to " rotate around it."

[Printed, 4*d*. No Drawings.]

### A.D. 1857, June 20.—N° 1730.

**WHITE**, JOSEPH.—(*Provisional protection only.*)—" Improve-" ments in escapements for chronometers and other timekeepers."

" In place of making the end of the detent of the escapement " into a fine spring, as heretofore, such detent is caused to be " fixed on an axis intermediate of its length, and such axis has a " fine coiled spring at the lower extremity, which constantly " tends to press the end (which is acted on by the cam on the " axis of the impulse roller) towards the escape wheel. In other " respects the detent acts in like manner to what it has heretofore " done, and the distance the detent is allowed to move in towards

" the escape wheel is regulated by a banking pin at the other end " of the detent to that where it is acted on by the cam, and in " order to adjust the escapement the bearings of the detent axis " are arranged to slide and to be fixed according to requirement. " Or the spring on the axis of the detent may be dispensed with " by placing two pallets on the axis, and connecting them by a " pin or screw to the detent in such manner that one of the teeth " of the escape wheel will act on one of the pallats" [pallets?], " and thereby return the detent towards the escape wheel."

[Printed, *4d.* No Drawings.]

### A.D. 1857, July 3.—N° 1860. (* *)

**GARDNER, JOHN EDMUND.**—(*Provisional protection only.*)— " Improvements in illuminated clocks, and in the apparatus em- " ployed for lighting the same."

This invention consists, first, "in forming the dials of illumi- " nated clocks of a simi-opaque glass, known commercially as " Patent enamelled flatted flint glass.

"Secondly, in regulating the gas supplied to the burners of " illuminated clocks by means of an ordinary dry regulator, con- " structed with a cover which serves to receive any gas which " may escape, and with a pipe for conveying such gas to the ex- " terior of the building in which the gas is used.

"Thirdly, in measuring the gas supplied to such burners by " means of dry meters, in which the valves are moved by a draw- " ing or pulling action only, and in which the diaphragms are " carried by a moveable arm or spindle, so centered that the " flexible materials which connect the valves with the sides of the " meters may with certainty be spread to their full extent in order " that the gas consumed may be measured with greater accuracy " than heretofore."

[Printed, *4d.* No Drawings.]

### A.D. 1857, July 3.—N° 1862.

**AGAR, JOHN, and AGAR, WILLIAM.**—"Improvements in " watches, and keys for the same."

According to this invention, the teeth of the "going barrel" are " disposed midway between the upper and lower extremities of " the barrel." By this means, the strain upon the lower part of the barrel and centre pinion is removed, and the friction is distributed more equally over all the actions than it is by the usual arrangement of the teeth round the extremity of the barrel. Great strength of mainspring is not required, by the use of this invention; also springs may be employed which are "susceptible "of more accurate medium adjustment" than the ordinary springs. It is to be remarked that the centre pinion is made sufficiently high to receive the barrel teeth when in action between the pivots.

In connection with the above-described "going barrel," an improved ratchet key is employed, as the said going barrel is wound from left to right. "The improvements of the key also "consist in the protection of the spiral" [helical?] "spring "from rust and dirt, by placing it in a chamber contrived in the "body of the key for the purpose, and in the manner in which "the several parts are put together so as to admit of being easily "taken asunder when required." The drawings represent a key in the shape of a pistol, with an upper and lower ratchet, the spring to the spindle of the lower ratchet being concealed in the body of the key.

[Printed, 8*d*. Drawings.]

### A.D. 1857, August 13.—N° 2162.

BENSON, JAMES WILLIAM.—(*Provisional protection only*.)— "Improvements in the construction of bows or handles of "watches, lockets, eye-glasses, and other articles requiring such "appendages."

This invention "has for its object to construct these appendages "in such a manner that they cannot be easily detached from the "article to which they are applied, thereby affording greater "security than the bows or handles now generally employed, and "which may be easily broken off."

The invention "consists in making the bows or handles with a "double swivel, which will admit of their turning round in "various directions, so that should any attempt be made to twist "off the bow from the article to which it is applied it will "turn on its axis instead of offering a rigid resistance, which "may be easily overcome by using a moderate amount of force. "This improved bow or handle may be attached to watches or "other articles by screwing or otherwise, or it may form part of "the case and be made therewith."

[Printed, 4*d*. No Drawings.]

### A.D. 1857, September 1.—N° 2288.

**TAYLOR, JOHN GEORGE.**—(*Provisional protection only.*)—" Im-" provements in the construction and alteration of doors, shutters, " blinds, and other closures to buildings and erections so as to " allow of their illumination, which improvements are also appli-" cable to omnibuses and other vehicles, and to clock dials, " lamps, and postal pillars."

"As regards the lighting of clocks," " my improvement is to " make the dial plate of a dark or opaque ground or colour, and " to have it so moulded or pressed out when hot if made of iron " or of metal; or where made of metal, or wood, or canvas, or " other materials, to pierce, perforate, or cut out holes or openings " in such dial plate so that the holes or openings so cut out may " represent the hours either in letters or figures, and the minutes " by a circle of holes or openings to be lighted by gas or other " light from the inside of the dial plate; and in like manner I " face and protect these holes or openings and the front surface " of the hands of the clock with bright coloured or plain glass, " or other transparent materials, and supply the hands with a " lighted gas apparatus (with or without reflectors) to revolve " therewith, so that during the night time such dark ground dial " plates, and the pierced holes or openings and lighted hands " would exhibit the hours and minutes of the night, when the " ordinary daylight inscription on the dial plate could not be " deciphered."

[Printed, 4*d*. No Drawings.]

### A.D. 1857, September 5.—N° 2324.

**NEWTON, WILLIAM EDWARD.**—(*A communication from Aaron D. Crane.*)—" Improvements in clocks or timekeepers."

The operating parts of the clock, which forms the subject of this invention, "are all actuated by power given off by the strik-" ing mechanism at the instant when the hour is sounded." A subsidiary cord (and weight) is wound up each time the striking shaft vibrates.

1st improvement.—" Pallets and scape wheels " are used to actuate the moving parts.

2nd improvement.—The mechanism that impels the pendulum consists principally of a rocking shaft provided with a counter-balance lever. The vibrations of the shaft are controlled by clicks and a detent which acts "against a block attached to the face of a "stop plate."

3rd improvement.—The striking hammer is balanced between two rods, and can thus make a long stroke.

4th improvement.—"Motion is communicated from the shaft "of the minute hand to the hour hand by means of a toothed "wheel and pins fixed in a star wheel that is mounted excentri-"cally to the toothed wheel, so that the pins are made to take in "between the teeth of the wheel, and thereby drive the hour "hand which is connected therewith."

5th improvement.—Causing the hands of the clock (when they have been stopped by any obstruction) to remain stationary for twelve hours; if, in the meantime, the obstruction is removed the hands then go on in the regular manner. A disc, with 12 teeth, is adapted to an arm of an escape wheel, and acts upon a lever connected therewith; a pin, projecting from the shaft of the escape wheel, takes into a notch at the end of the arm. The pin and lever only come into coincidence once in twelve hours.

[Printed, 1*s*. Drawings.]

### A.D. 1857, September 5.—N° 2327. (* *)

FONTAINEMOREAU, Peter Armand le Comte de.—(*A communication.*)—"An improved timekeeper dial, shewing the exact "time in different countries."

This invention consists in "the forming of a universal com-"parative dial, suitable for electric telegraphs, railways, and clocks "in general, by means of circles or horizontal lines divided into "hours, and arranged according to the difference of longitude, for "shewing the comparative time of places or towns thereon."

In one plan there are as many concentric circles as towns, and a single hand working from the centre of the dial indicates the comparative time.

When "there is not more than an hour's difference" between the extreme towns, one circle may be "divided into twelve hours, "and the others into sixty minutes;" "two hands, as usual," may be used in this case.

"To avoid increasing the size of the dial to a too great extent," only one divided circle may be used, there must then be as many hands as towns.

"If horizontal lines be substituted for circles," a "table may be "formed" based upon the same principles of construction as the above-described dials. It is proposed to use a plumb line in connection with this table.

[Printed, 6*d*. Drawing.]

### A.D. 1857, November 2.—N° 2779.

**KIRKMAN, Robert.**—(*Provisional protection only.*)—"Im-"provements in the fusees of lever and other watches."

"First, in that part of the fusee called the 'top,' in place of "the brass little ratchet hitherto used I substitute a steel one.

"Secondly, I screw the ratchet fusee brass and cap together in "one solid piece, instead of simply pinning such ratchet to the "fusee brass only, (without being secured to the cap) as always "has been hitherto done."

[Printed, 4*d*. No Drawings.]

### A.D. 1857, November 17.—N° 2887.

**JOHNSON, Edward Daniel.**—"An improvement in the "construction of fuzee watches."

"The object of this invention is to wind up and to set the "hands of watches constructed on the going fuzee principle "without the aid of a key."

A spindle, which passes through the pendant, carries a milled knob on its outer end, and a bevilled pinion on its inner end. This pinion drives a wheel "keyed to a stout axle, which passes "through both the plates of the watch; keyed to this axle are "two spur wheels, one of which is for driving (through an inter-"mediate wheel) a spur wheel mounted on the ordinary fuzee "square, and furnished with a ratchet and click to prevent action "one way. The other spur wheel is for driving (also through an "intermediate wheel) the minute wheel. These intermediate "wheels are mounted on rocking bars secured in position at "opposite sides of the watch by fulcrum pins, and pressed "against by springs, which throw the intermediate wheels out of "gear when not in immediate use. A stud attached to the head "of each rocking bar and projecting through the rim of the "watch case affords the means of pressing either intermediate "wheel into gear, as required, and thus communicating the "motion of the driving spindle (that passes through the "pendant)" either to the minute wheel or to the fusee square.

In the Provisional Specification, a roller (between the cap of the fusee and the intermediate wheel) is described as pushing the intermediate wheel out of gear when the watch is sufficiently wound.

[Printed, 8d. Drawing.]

### A.D. 1857, November 18.—N° 2896.

**BETTLE, Philip.**—"An improvement in the construction of "watches."

An outer case is capable of motion upon swivels or swivel pins, the movement box being mounted on the said pins; thus the face or dial may be either upon the open side of the outer case (when shut), and thus directly visible, or it may be upon the closed side of the outer case and consequently can only be seen by opening the said closed side or back plate.

The object of this improvement "is to enable the wearer of a "watch to transform it from a hunter to an open-faced watch, or "vice versa, at pleasure, without detaching the box or inner case "from the outer case." The "swivel frame" on the before-mentioned swivel pins contains the movement box within itself. "To the opposite sides of the swivel frame an open ring or rim "and a back plate, cover, or shell, are hinged, the open ring or "rim at one side, and the back plate, cover, or shell at the other "side, and these together form the outer case, which closes upon "and fits tightly against the exterior of the box containing the "works."

The pendant is attached to one of the swivel pins which passes through a socket fixed to the swivel frame and is secured to the periphery of the movement box. The opposite swivel pin to the said pin and pendant is affixed to the swivel frame and enters a hole in the movement case.

[Printed, 8d. Drawing.]

### A.D. 1857, November 28.—N° 2963.

**MENNONS, Marc Antoine François.**—(*A communication.*)—(*Provisional protection only.*)—"An improved tell-tale clock or "timekeeper."

"The invention consists in the application to a clock or time-"piece movement of a mechanical arrangement which causes a "trap to open when desired, that is to say, every hour, half hour, "and quarter of an hour, and maintains it in this position for a

" greater or less space of time as required. The opening and " closing are effected by means of catches or triggers, which act " on a lever fixed to the dial of the clock. The opening of this " trap permits the introduction of a supply of numbered markers, " or any other controlling medium, which fall into receptacles " fixed to a horizontal circular plate, worked by the same escapement as the clock. These receptacles are numbered so as to " correspond with the figures on the dial. In this way the " markers fall into the receptacles which correspond respectively " to the hours at which they were introduced. This apparatus " acts as a check on the going out or coming in of workpeople, " and for other similar purposes."

[Printed, 4*d*. No Drawings.]

## A.D. 1857, December 4.—N° 3012.

GRIZARD, JOSEPH.—" Improvements in watches, and in the " means of or for winding up and setting watches."

1st. " The construction of an improved watch," in which " the " motor is a simple spring (shaped something like the hammer of " a fire-arm) " acting on the arm of a toothed quadrant so contrived as to obtain a continuous equal or regular action. The quadrant " is in gear with a pinion free to turn on the axis " of the centre wheel, and carrying a very small ratchet contrivance; the motor spring has on its longer branch a roller," which acts on the curved arm of the quadrant. The winding up is effected " by means of a piece or bolt projecting a little beyond " the edge of the case, to which is attached a stud which presses " or acts on one of the arms " of the quadrant, " so that by the " pressure of the projecting piece acting on this stud the watch " is wound up. The hands are set by means of a stud on the " pendant, to which a rod is fixed, retained in position by a " spring, and carrying a serrated or toothed pinion, which on " drawing back the stud gears into a double set of teeth under " the return minute wheel."

2nd. The winding up of watches in which a barrel is used. Instead of having a key square, the barrel arbor is formed with a ring notched into two teeth " having two spaces with a central stud, " on which the key fits." " The same appliances and construction " may be applied to keys for setting the hands."

[Printed, 6*d*. Drawing.]

A.D. 1857, December 10.—N° 3049.

**HODDELL, James.**—" An improvement in watches."

This invention " consists in the application to watches of two " mainsprings instead of one, as in watches of the ordinary " construction."

The drawings show two barrels, in each of which is a mainspring, the said barrels being side by side. The fusees are of the ordinary construction, " excepting that the threads are cut in a " contrary direction;" they are connected in the usual way with the barrels of the mainsprings respectively. " The works of the " watch differ in no essential respect from the works of ordinary " watches, excepting that I employ an additional wheel and " pinion in the train of wheels between the springs and balance " wheel or escapement." In an ordinary watch the fusee is geared to and turns the centre wheel carrying the minute hand. In using two springs, it is preferred to make the fusees gear into a pinion, a wheel on the axis of the said pinion gearing into and driving the centre pinion.

By this arrangement a watch may be made to work eight days.

The spring barrels may be made to drive the works " without " the intervention of a fusee." The two springs require to be wound up separately; they act jointly and simultaneously upon the works.

[Printed, 6*d*. Drawing.]

A.D. 1857, December 28.—N° 3168.

**BRUCE, Alexander.**—" Improvements in watches and time" pieces."

1st. " Improved modes of working the independent seconds."— Only one mainspring and train are used to work the independent seconds. On the arbor of the escapement is placed a ratchet wheel " which acts by means of a lever, spring, and catch upon " a ratchet wheel placed upon the staff or shaft of the cannon " pinion, the boss of the said wheel carrying the independent " seconds' hand."

In another arrangement, the independent seconds hand is put in action " by placing it upon or connecting it to the boss of a " ratchet wheel, acted upon by a catch, spring, and lever, the " latter having an intermittent motion by means of the vibration

" of a pin on a lever, operated upon by a ratchet wheel on the " shaft or arbor of the fourth wheel pinion, it can also be pro- " duced from the third wheel pinion by the same arrangement " or by a ratchet, snail, and lever from the third and fourth " wheel pinions or shafts."

2nd. "Improved chronometer escapements, having circular " pallets,"—An angular lever and spring locks and unlocks the wheel instead of a detent, "the said angular lever and spring " being acted upon by a small roller having two small stones " placed so as to form a slit or fork, or one stone slit so as to form " a kind of fork or opening."

[Printed, 8*d*. Drawing.]

A.D. 1857, December 29.—Nº 3180.

**HARGREAVES, John, and HARGREAVES, Joseph.** — (*Provisional protection only*.)—"Improvements in winding up " watches which have not fusees or chains."

"It has always been an objection to watches made without " fusees and chains that their winding the contrary way to all " other English made watches made them liable to be often put " out of order. We propose remedying this by using an extra " ratchet wheel, gearing it with the key ratchet wheel at present " used; by this means we can wind up in the same way as English " watches which have fusees and chains, and thereby prevent the " possibility of these watches being put out of repair by winding " the wrong way. By this construction we can make these " watches much flatter or thinner than any English watch hitherto " made, and consequently make them more suitable for the " pocket. We therefore claim as our invention the application " of an extra ratchet wheel by which we accomplish the ends " already described."

[Printed, 4*d*. No Drawings.]

## 1858.

A.D. 1858, January 20.—Nº 94.

**NIXON, Christopher Nugent.**—"Improvements in the ap- " plication of screw power, such improvements being applicable

" to steering apparatus, capstans, windlasses, cranes, winches, " and other mechanical purposes."

This invention comprises the use of endless screws for the above-mentioned purposes.

In the ordinary method of applying this invention, pinions are placed on the ends of screw spindles, and a larger wheel is used to turn them. When, however, this invention is applied to clocks and watches, three equal wheels are preferred. The centre wheel is " attached to the barrel," " it being also attached to the minute " hand. The spindle of the worm wheel (which, in this case " revolves) has twelve teeth, and is attached to the hour hand." One revolution of the centre wheel carries the minute hand once round, and at the same time effects a complete revolution of the screws carrying the hour hand one-twelfth round, which is equivalent to one hour.

"Another method with one screw is as follows:—From and " attached to the barrel" "proceeds a single spindle, bearing a " screw thread, and to the end of which is fixed the minute hand. " The screw part of this spindle passes through a hollow wormed " wheel, having twelve teeth in the internal circumference, and " which is attached to the hour hand. By the revolution of the " above-mentioned barrel" " the same result is produced as " before described."

The specific application of this invention to clocks and watches is not described in the Provisional Specification.

[Printed, 10*d*. Drawings.]

### A.D. 1858, February 9.—N° 238.

WELLS, JOHN.—" Improvements in watch cases."

This invention " consists in the particular construction whereby " the open-faced watch can be readily converted into a hunting " watch, and on the contrary, the hunting watch can be as readily " converted into an open-faced watch."

" I form the watch in the manner of an ordinary hunting " watch, with this exception, that I remove as much of the bottom " or dome that encloses the face of the watch, so as to expose the " whole of the dial. The part so removed or rather made separately is fitted to the ring or bizell remaining of that dome, so " as to snap into its place in manner similar to a watch glass. " The watch is in fact made with two bizells, the under one for

" the watch glass as usual, and another fitting very closely there- " to to carry the moveable bottom or dome before mentioned, " which fits and snaps on so as to cover the face and form a " hunting watch. This outer bizell I cause to open by the spring " and thumb knob in the pendent, so as to expose the dial " exactly as in a hunting watch. To convert the hunting watch " into an open-faced watch, I remove the false dome or bottom " from the face, and snap it on the back of the case, for which " purpose a groove or snap is formed thereon to receive it, " similar to the snap of the bizell, whereby it is held, and where " it remains until it is again wished to convert the watch into a " hunting watch."

[Printed, 6*d*. Drawing.]

A.D. 1858, February 13.—N° 278.

JOHNSON, Edward Daniel.—"An improved construction " of chronometer case."

The object of this invention is to render the chronometer case air-tight.

" The glass bizzel is made to fit or slide on," "and it is fur- " nished with a lip which laps over the box beyond the bottom " of the slip or junction, and rests against a shoulder." The ordinary glass is cemented into its place, and a vulcanised india-rubber ring is interposed between the cover and the box. The cover is then pressed down and kept in this position by screws. The ratchet winding key fits on to a cylindrical nose, which passes "through a stuffing box in the bottom of the case opposite " the winding square, and is kept out of contact with the " square" by a coiled spring that surrounds the nose. The stuffing box, spring, and nose of the key are enclosed in a bag formed by a disc of vulcanised india-rubber, the edges of which are secured to the bottom of the case by a ring and screws. "The " nose of the key or winding instrument passes through an " opening in this india-rubber disc or sheet, the edges of which " opening are secured between clamping rings.

" In order to bring the nose of the key or winding instrument " into a position to act, it is pressed forward on to the square of " the fuzee by means of the key handle, and when in that " position an axial motion is given to the key handle, and the " fuzee square is turned."

[Printed, 6*d*. Drawing.]

### A.D. 1858, March 5.—N° 443.

**COLE, James Ferguson.**—(*Provisional protection only.*)—" An " improvement in watches and other timekeepers, and an improved " escapement wheel or pallet to be employed therein."

1st. " Imparting to the lever of impulse a new power or property " of resilient action, which allows the ruby pin or pallet to pass " when making more than an entire revolution from the point of " rest by displacing the lever a little, which instantly resumes its " proper position." The ruby pin in returning first enters the fork, unlocks the wheel, is carried out of the fork in the same direction, passes the lever on the reverse side of the line of centres without entering the fork until the balance returns in the contrary direction, and is restored to its first condition by the resilient action of the lever and the momentum of the balance.

2nd. "A new form of escapement wheel."—The escapement-wheel teeth have "an additional forward angle contrary to and " below the locking face of each tooth." The additional second recoil necessary for the suitable action of the 1st improvement is produced by this form of escapement wheel. The effect of the double recoil may be "produced on common pallets by putting " the ratchet-toothed brass or gold wheel reversely on the 'scape " pinion, and by a very simple and correct process bending the " point of each tooth outwardly and forward over the back slope " until a sufficient angle for locking is formed by the bent points.

[Printed, 4*d*. No Drawings.]

### A.D. 1858, March 9.—N° 480.

**PEPPÉ, George Tosco, and GOODMAN, Louis.** — (*Provisional protection only.*)—" Improvements in the construction " and arrangement of timekeepers."

This invention relates to certain improvements upon and modifications of that described in No. 12,983 (A.D. 1850) in which equal portions of time are indicated by the descent of mercury in a glass tube, and regulated by the passage of air through a small orifice or porous stopper.

" According to one modification, two straight glass tubes are " used; the one open at both ends and enclosed within the other, " which is hermetically sealed at each end, leaving a space between " the external surface of the inner tube and the internal surface

" of the outer tube." The inner tube contains mercury and is contracted near one end; the escape of the mercury is prevented by plugs of blotting paper. The apparatus is made to slide along an index, and can be reversed when the mercury has run down, the index having double columns of divisions for that purpose.

In another apparatus one column of divisions only is used. " The mercury on arriving at the bottom of the tube is run back " to the top by temporarily reversing the apparatus and opening a " small valve."

In a third arrangement, a spiral or ring-formed tube, having its ends connected by a contracted throat (or porous stopper) containing mercury, and carrying a disc, is mounted on a horizontal axis. A weight and cord tend to turn the spiral, and a stationary pointer shows the time.

In another modification of the ring-formed instrument, the mercury is dispensed with, and the air is confined between the compressed portion of a ring-formed india-rubber flexible tube and the contracted throat, a small roller bearing upon one side of the ring. As the ring revolves, the air is forced slowly through the throat.

[Printed, 4*d*. No Drawings.]

### A.D. 1858, March 18.—N° 562.

**REDIER, JOSEPH ANTOINE JEAN.** — (*Provisional protection only.*)—" An improved chronometer called 'chronoscope.' "

This instrument " is intended for delicate chronometrical obser-" vations in astronomy; it can also be used for experiments of " short duration, and is based on the faculty possessed by the " ear of detecting the coincidence of two shocks."

The chronoscope consists of an ordinary chronometer train made and adjusted in a cylindrical box of copper. The escape wheel is placed at the centre of the plate of the movement; on its projecting pivot a three-toothed star wheel is adjusted, the said star wheel revolving in three seconds. Another movement of the same size, in a similar box, and standing in the place of the train of independent seconds sometimes used with watches, is adjusted on the said chronometer train so as to be superposed thereon. " The two superposed movements may move any extent in " relation with each other, which movement can be measured by " divisions traced immediately on one of the boxes." The upper movement "actuates a hand acting on a dial, which marks hours, "minutes, and seconds as usual." The fly of the upper train stops on the teeth of the three-toothed star wheel; "if the upper "movement be made to turn at will, relatively to the lower "movement, the upper second hand will thus change the move-"ment of its escapement and the time of the sharp blow of its "train will be changed, and this is the fundamental principle of "the chronoscope."

The chronoscope may be used to ascertain the difference of time between two clocks, or to indicate on deck the hour of the chronometer in the cabin, when it is necessary to ascertain the longitude on board ship.

[Printed, 4*d*. No Drawings.]

## A.D. 1858, March 19.—N° 564.

**BROCKLEBANK, Henry.**—"Improvements in chronometers, "watches, and timekeepers."

The detent spring is constructed "of a curved form," and the passing or relieving spring is made of round wire, hammered or flattened if necessary. The stop pin in the detent is placed "in "a horizontal position or in the same plane as the escape wheel. "The balance arbor is furnished with one roller or disc, in the "side of which a jewelled pallet is fixed, and which roller also "carries a pin for lifting the detent." A centre seconds hand is placed "below or behind the hour and minute hands," and is mounted on a "tube or collar which turns loose upon the boss "of the hour wheel. It has a wheel attached to it which is "driven by an intermediate pinion receiving its motion from an "extra fourth wheel or a wheel carrying a pinion driven by the "third wheel, or other convenient wheel of the watch or chrono-"meter. This intermediate pinion also drives another wheel "carried by a lever or sliding plate, which wheel carries an "independent seconds hand which can be stopped at any time "by moving the lever or slide without stopping the watch, and "again started when required."

The drawings show the above points, and certain modifications of the same. In lieu of a notch or pallet in the edge of the roller "the pallet may consist of a pin of semi-cylindrical or other "suitable form fixed in the roller."

"The action of the escapement is the same as that of the " ordinary chronometer escapement."

[Printed, 8*d*. Drawing.]

### A.D. 1858, March 19.—N° 573.

YOUNG, JAMES.—" Improvements in chronometers, clocks, and " watches."

1st. " The application of a ratchet wheel click and spring to " the fuzee arbor pivot," thus furnishing an improved means for detaching and replacing the movements of timekeepers.—" When " the mechanism is wound up and the click is fitted to the ratchet " wheel, which is on the square pivot, it instantly arrests the " power of the fusee on main wheel, detaches it from the rest of " the wheelwork, and leaves them at liberty to be taken out and " repaired."

2nd. A construction of pallet fork to prevent the locking of the escapement.—The brass pin which is on the upper surface of the fork is removed; two brass segments (placed there instead of the said brass pin) meet in the centre of the fork, " their apices " or points of junction being inserted in the hollow part of the " roller. When the ruby pin, which is on the under side of the " balance wheel roller leaves the fork, the roller fits into one of " the segments, such segment being at that time concentric or " nearly so with the roller; when the ruby pin takes the fork " back and leaves the fork the roller advances into the other " segment; the hollow part of the roller allowing the point of " junction of the segments to pass in the same manner as it allows " the pin to pass in the old arrangement."

[Printed, 6*d*. Drawing.]

### A.D. 1858, April 10.—N° 775.

BRUN, PIERRE.—(*A communication from François Maniguet.*)— " The application of an improved blowing fan to steady or port" able forges, with or without reverberatory furnaces as well as to " ventilation in general."

"This invention consists of an improved blowing fan, and its " application chiefly to fixed or portable forges with or without a " reverberatory or heating furnace for the purpose of heating, " annealing, or melting metals, and also for heating or ventilating " halls, churches, theatres, hospitals, workrooms, &c."

The fan is placed in a cylindrical box with a tangential pipe thereto, the said pipe forming at its external opening a tuyere which enters the fire or combustion chamber of the furnace. The wings of the fan are made "half hollow," and they radiate from the central axis; they are actuated by means of a screw wheel on the driving axis that rotates an endless screw on the axis of the wings.

A small blowing fan that "can be used by goldsmiths, jewellers, "watchmakers, enamellers, &c., for heating, soldering, and melting metals with the blowpipe and enamel or other lumps" [lamps?] consists of arrangements similar to those above mentioned, except that a screw wheel drives an endless screw on an intermediate shaft which also carries a second screw wheel that drives the endless screw on the fan shaft. Motion may be imparted to the driving axis, either by means of a hand crank, or a spring and spring barrel.

A reverberatory furnace has a heating chamber, into which the hot blast comes, also a "reheating chamber" into which the said blast afterwards passes. Each of these chambers have doors for placing the articles in the furnace. The blast enters at the bottom of the fireplace and is covered by a perforated plate.

[Printed, 1*s.* 6*d.* Drawings.]

## A.D. 1858, April 30.—N° 960.

DE LOWENDAL, R. B. Huygens.—(*Provisional protection only.*)—"Improvements in the construction of springs, and for "their new application to the working of machinery."

1st. "The forming or shaping metallic or other springs in such "manner as that they shall have more than one curvature, so "that in one portion of the spring at least there shall be a duplication of the curve." "Greater proportionate power" is said to be obtained "by the use of a spring with a double curve," "than from an ordinary spring."

2nd. "Using springs of two or more curvatures as auxiliary to "ordinary motive power."

The drawings show various forms of springs upon the above plan. A toothed wheel is represented, made up of separate discs that "work in friction grooves made in each other." The central disc is connected to the exterior disc by the said springs; intermediate discs carry projections that compress the springs in one direction or its opposite according to the direction of motion of the central disc. When the pressure is relaxed, the exterior disc " is carried back by the force of the springs."

"It is proposed to apply springs shaped in this manner to " clocks & watches, so that if the clock or watch happens to be " wound in the wrong direction, no harm will ensue to the clock " or watch spring, as it is found that the spring will not snap if " it is turned in either direction when it is supplied with two or " more curvatures."

[Printed, 6*d*. Drawing.]

### A.D. 1858, May 14.—N° 1086.

**CARPENTER, SAMUEL.**—"Improvements in escapements for " watches and other timekeepers."

"The use of a horizontal escape wheel with three rows of teeth, " of which two rows are vertical and one row horizontal, the two " rows of vertical teeth being so arranged that the staff which " carries the pallets can have its bottom bearing between them, " so as to allow a tooth on each row to act alternately on the " pallets. For this purpose the escape wheel is formed with two " concentric rings, one within the other, the vertical teeth on " the outer ring being opposite to the spaces between those on " the inner ring, and the teeth on the inner ring being opposite " to the spaces on the outer ring; around the latter ring are also " inserted a series of horizontal teeth, equal in number to the " vertical teeth on both rings.

"The vertical teeth are for the purpose of giving the required " impulses to the pallets on the staff of the balance, a tooth on " one ring striking the pallet on one side of the staff, and the " next tooth on the other ring striking the pallet on the other " side of the same; and the horizontal teeth are for the purpose " of causing the wheel to be stopped as required, by their coming " in contact successively with the catch of the detent spring, the " said catch being withdrawn from each tooth successively so as " to liberate the wheel by means of a pin on the pallet disc being " brought in contact with an arm on the end of the detent " spring."

The timekeeper is thus prevented from setting by a sudden jerk.

[Printed, 8*d*. Drawing.]

A.D. 1858, May 29.—Nº 1211.

**DOLD, ALEXANDER.**—(*Provisional protection only.*)—" Im-
" proved apparatus for winding clocks, which apparatus is also
" applicable as a motor for all machinery usually turned by hand,
" horse, or other power, and for preventing the descent of smoke
" into chambers or other places."

" On an upright hollow shaft, the upper end of which shall be
" in the open air, I fix a horizontal circular plate at any con-
" venient distance; above this a ring is placed, and over the ring
" a dome. Vertical bars or plates (working diagonally) pass from
" the circular horizontal plate to the ring supporting it, being
" sustained thereby. These plates are so arranged, as to allow a
" greater or lesser quantity of air to pass through them to act on
" fliers. A rod passes through the hollow shaft and circular
" plate; on the top portion of this, and between the plate and
" ring aforesaid, certain volants or fliers are attached. The wind,
" in whatever quarter it may be, passes through the diagonal
" vertical plates, impinges on the volants, and having turned the
" rod, passes out, the rod thus rotating works into a gearing
" (according to the purposes required), and communicates motion
" thereto. As the force of wind might turn the rod too rapidly,
" if not prevented by an arrangement for closing or partially
" closing the vertical plates, I regulate the supply. For prevent-
" ing the descent of smoke, the hollow shaft is dispensed with,
" and instead of a bottom circular plate, a ring only should be
" used."

[Printed, 4d. No Drawings.]

A.D. 1858, June 2.—Nº 1241.

**WHEATSTONE, CHARLES.**—" Improvements in electro-mag-
" netic telegraphs and apparatus used for transmitting signs or
" indications to distant places by means of electricity."

The first part of this invention, comprising the 1st, 2nd, and 3rd improvements, " relates to improvements in the signal instru-
" ment."

The second part, comprising the 4th, 5th, 6th, 7th, 8th, and 9th improvements, relates to improvements in the transmitting instrument, " and to improvements in magneto-electric and electro-
" magnetic machines employed in conjunction therewith."

The third part "relates to improvements in electro-magnetic "alarums, clocks, and registers or counters." This part comprises the 10th, 11th, 12th, 13th, 14th, and 15th improvements."

10th improvement.—The application of the electro-magnetic arrangements described under the 2nd improvement "to the withdrawal of detents for the purpose of permitting alarums to "sound."

The said electro-magnetic arrangements comprise the following apparatus and modifications thereof:—"Two magnetic needles or "bars with their poles in opposite directions, are placed near each "other on opposite sides and parallel to the axis, round which "they move; two straight electro-magnets are placed one on "each side of the axis of motion of the needles, and parallel "thereto; when a current is transmitted through the coils of "these electro-magnets in such manner that the adjacent poles "of each shall have at the same time opposite polarities, the "dissimilar poles of the two needles are simultaneously acted "upon, so that each of their poles is attracted by one pole of one "electro-magnet, and repelled by one pole of the other electro-"magnet, the attracting and repelling actions all conspiring to "move the axis in the same direction."

The manner of making this application is as follows:—A short arm, on the axis of motion of the electro-magnetic arrangement, carries pins by means of which a lever is liberated, which partially rotates an axis (flattened on one side), and thus liberates a second lever, whose axis (also by means of pins) liberates the detent.

11th improvement.—"Appropriate mechanism to prevent the "detent of an electro-magnetic alarum from escaping until "several currents or shocks have been sent through the circuit, "and consequently until the magnetic bars have moved to and "fro several times. For this purpose the electro-magnetic apparatus is caused to actuate a species of escapement, which at "each movement allows to escape one tooth of a short rack in "connection with the alarum." The pins on the short arm mentioned in the 10th improvement act as pallets, and the end of the first-mentioned lever carries several teeth (three are shown in the drawings) that act as escape teeth.

12th improvement.—"An appropriate mechanism to prevent "the hammer of a bell from moving unless the magnets are "acted upon by the electric force." "For this purpose a pin is

" fixed to the periphery of the toothed wheel, which gives vibra-
" tory motion to the hammer in such a position that just as the
" motion of this wheel is arrested, when the alarum ceases to
" sound, the pin acts on a catch, and places it so as to restrain
" or limit the vibrations of the hammer arising from concussions
" to which the instrument may be subjected. When the alarum
" is next acted on by currents or shocks passing in the line wire,
" and the obstacle which retains the train of wheels is thus
" removed, the motion of the toothed wheel which carries the
" pin above mentioned immediately liberates the hammer, and
" allows the alarum to sound freely."

13th improvement.—"The application of the first and second
" improvements above specified to the construction of electro-
" magnetic telegraphic or sympathetic clocks."

The 1st improvement, as applicable to the 13th improvement, consists in "the construction of the mechanism which converts
" the oscillatory motion of a magnetic needle or bar or the arma-
" ture of an electro-magnet into the rotary step-by-step motion
" of the hand." Two propelments are described and shown. In one method two pallets are mounted upon separate axes, their longer ends act on the inclined teeth of the propelling wheel at opposite points of its circumference, and their shorter ends are connected by a hair spring; "a pin attached to the axis of the
" magnetic needle or bar, or to the armature of the electro-
" magnet, acts in its alternate motion on each pallet, and presses
" it firmly against a tooth of the wheel, while at the same time
" the hair spring presses the other pallet against the opposite
" tooth, but so lightly and yieldingly as to offer no sensible
" impediment to its motion." "In a second method, the axis of
" the propelling wheel, instead of being fixed, is attached to the
" end of a short lever, the other arm of which is acted upon by
" a pin connected with the magnetic needle or bar, or the arma-
" ture of the electro-magnet," or the centre of motion of the lever may be the centre of motion of the magnetic needle. The rotary motion of the wheel is occasioned by its motion towards two fixed pallets alternately. Spring tangential pallets are used; thus, although the teeth are efficiently propelled, the spring readily yields to a tooth passing beneath it. A driving pin connects the wheel axis with the axis of the hand or pointer.

The 2nd improvement, as applicable to this 13th improvement, has been described under the head of the 10th improvement.

"These clocks resemble the step-by-step telegraphs in many " particulars, differing from them only in the following:—1stly, " the dial instead of showing the letters of the alphabet shews " the hours with their usual divisions. 2ndly, the power acting " primarily on the axis of the second's hand is communicated by " a small train of wheels to the minute and hour hands. A " rheotrope is adapted to the regulating clock for the purpose of " alternately inverting the current proceeding from a voltaic battery instead of a rheotome, which merely determines a succession of currents in the same direction." The only changes in the step-by-step instrument are "that the pallet wheel has thirty " teeth in place of fifteen (if the regulating clock transmits one " current or shock per second), and that the pallet wheel, as before " mentioned, actuates a train of wheels as in an ordinary clock."

14th improvement.—The application of the 1st and 2nd improvements to telegraphic registers or counters. This application differs from the 13th improvement only in the proportion of the train wheels, and in the divisions of the dials.

15th improvement.—The application of magneto-electricity to work registers or counters. The armature axis is suitably attached to the machine, the motions of which are to be registered.

[Printed, 5*s*. Drawings.]

### A.D. 1858, June 30.—N° 1471.

**FATTORINI**, SANTINI.—(*Provisional protection only*.)—"An " universal meridian applicable to mathematical, geometrical, and " precise instruments."

"This invention consists of a division of the circumference into " 384° instead of 360°, as it has been hitherto divided, and in the " application of the said division to any quadrant, pendulum, " chronometer, compass, protractor, or any other instrument of " precision used in mathematical, geometrical, astronomical, " nautical, or other operations or calculations for measuring time " and distance, &c.

"The instrument made on the principle as a protractor, for " instance, which I mention as a better means of illustrating my " said invention, shall be divided on its semicircular shape into " 192°, and also in its vertical and longitudinal surfaces by a " number of degrees giving the radius or diameter of the whole " circumference."

[Printed, 4*d*. No Drawings.]

### A.D. 1858, August 11.—N° 1829.

**BROOMAN**, Richard Archibald.—(*A communication from F. P. Vaglica.*)—(*Provisional protection only.*)—" Improvements in " timekeepers."

" This invention relates to the regulation of timekeepers put " in motion by weights, springs, or otherwise, and consists in " the construction and employment of pendulums formed and " fitted as follows :—Each pendulum consists of two horizontal " or nearly horizontal arms, carrying discs, each arm being " formed of a metal or other material of different expansibility " to the other, and the two being so combined that as their " lengths are caused to vary by variations of temperature the " angles which they form with each other or with a vertical line " shall also vary in such manner that the distance of their " common centre of gravity below the point of suspension may " be constant, and therefore the times of oscillation of the " pendulum be constant. The discs before-mentioned may be " furnished with indicators to indicate the variations in the " dilatations of the arms, and the corresponding variations in the " angles made by them."

[Printed, 4*d.* No Drawings.]

### A.D. 1858, September 4.—N° 2003.

**GUYE**, August.—" Improvements in the escapement of chrono- " meters and watches."

This invention " consists in the detent being provided with " ruby locking pallets formed with angular shaped sides, so as to " form a step movement for releasing consecutively the teeth of " the escapement wheel, in connection with a suitable arrange- " ment of two hair springs by which the unlocking of the said " wheel is effected, and a dead beat of the seconds obtained. In " lever watches I also employ two hair springs in connection with " the lever for steadying the action, when shaken or otherwise."

The following arrangements are shown in the drawings :—

1. The lever carries two hair springs and the locking pallets. An impulse pallet and an unlocking pallet are on the balance-wheel axis. In this arrangement a second impulse during the same vibration is avoided.

2. A dead beat seconds escapement.—The same as the first arrangement, excepting that the escape wheel has upright "impulse" teeth, as well as horizontal "teeth of repose."

3. Arms on the lever axis bring back the detent. One arm has a ruby pin upon its extremity, of suitable form; the said pin penetrates within the circumference of the wheel when the balance unlocks the lever.

4. The ordinary lever escapement with the said two hair springs, which give the impulse, and allow of the balance wheel making "several consecutive revolutions in the same direction without "altering the regularity of the motion of the watch."

5. Two stops are on the same pallet. The two hair springs (with respective unlocking pallets) are at different heights, one on the lever, the other fixed to the frame. The working extremities of the lever are on opposite sides of the balance-wheel axis.

6. A dead beat seconds escapement.—The escape wheel has two rows of teeth; the two hair springs are set at the same height and are attached to the lever; and there is only one unlocking pallet on the axis of the balance wheel.

[Printed, 8*d*. Drawing.]

### A.D. 1858, September 28.—N° 2164.

LEWTHWAITE, Edwin, and AMBLER, George.—(*Provisional protection only.*)—"Improvements in clocks, watches, "chronometers, and other timepieces."

"This invention relates, firstly, to the escapement, and consists "in dispensing with the 'pallet wheel' now used, and substituting in lieu thereof a 'propeller' made of metal, stone, or "other suitable material, formed with one or more very short "arms, pins, or radii which act upon the pallet as a 'dead beat,' "or otherwise. By this improvement we avoid to a great extent "the variations in time caused by the changes of temperature "expanding and contracting the pallet wheel.

"Secondly, to the fusee, and consists in having the driver "or first motion wheel formed with inverted cogs or teeth in addition to the cogs or teeth now thereon, such wheel to be loose "upon the axis or spindle of the fusee, and gearing with a "small pinion working on a stud attached to the fusee, which "gears with a pinion affixed on the axis or spindle. By this

“ means power or continuous action is maintained whilst winding “ up.”

[Printed, 4*d*. No Drawings.]

### A.D. 1858, October 21.—N° 2349.

CLERC, Peter, and PIAGET, Adolphe.—(*Provisional protection only.*) — “An improved method of winding watches, “ chronometers, and timepieces without the use of a seperate “ key.”

“The purpose of utility to which the shape or configuration of “ the part has referrence is the facility of winding the watch, as “ allso set hands, chronomiter, and timepiece without a key. “ The machinery being attached to the watch, a piece is cut “ round the wind-up hole, more or less, according to the size of “ the watch, and then a piece of the same metal and shape is “ introduced in the said hole and fitted to the square or pipe; “ then a handle forming part of the round plate is raised, and “ when held with the thumb and fore-finger will wind easily. The “ handle is then shut level with the dome of the watch so that it “ is not seen, and by that contrivance that watch is preserved “ from dust.”

[Printed, 4*d*. No Drawings.]

### A.D. 1858, October 21.—N° 2352.

HORN, Edwin Bartholomew.—“An improved compensation “ apparatus for a hair spring balance for a watch or timepiece.”

A “compensating spiral coil,” separate from the balance wheel, is applied to the hair spring “ to compensate for the stretching” of the said hair spring, “caused by different degrees of temperature.”

The compensating coil is “ composed of two metals of variable “ expansive properties,” such as brass and steel, the steel portion of the said coil being outermost. The coil is “held stationary at “ its inner end,” and has “its outer end connected to the outer “ end or part of the hair spring.” “The hair spring at its inner “ end is attached in the usual manner to the balance, and has its “ outer coil laying in a slit” in the rear bent arm of an ordinary regulator. The inner end of the coil is fixed to a cylindrical projection extending upward from a plate which turns on a pivot extending upward from a standard. When the plate is turned laterally on its pivot, the coil, the hair spring, and the balance are moved with it, consequently the pin or tripper of the escapement lever is moved with such movement of the balance, the object or purpose of the plate being to enable the pin to be properly adjusted to the escapement lever. A semicircular arc projects from the plate; this arc carries a notched slider to receive the coil. The slider is a regulator for the coil "with reference " to its action on the hair spring."

[Printed, 6*d*. Drawing.]

### A.D. 1858, October 26.—N° 2386.

WIELAND, CHARLES.—(*Provisional protection only.*)—" Certain " improvements in chronometers, watches, and such like time- " keepers."

"This invention relates to the balances" of the said timekeepers. "Instead of making the rim of the balance divided," the said rim is "made of one entire piece of metal, and to the " bar and rim of such improved balance the following parts " are connected for giving the compensating property thereto, " namely, two curved pieces of two different kinds of metal " connected together in the usual way of uniting metals together " in the manufacture of compensation balances, so as to combine " and render useful the expanding and contracting properties of " these metals." "The novelty of this invention consists in the " manner in which the aforesaid pieces of metal are connected to " and operate upon the balance." "One end of each of such " said compound curved pieces of metal" is affixed "to the rim " of the balance;" the other end of such said pieces" takes " hold of one end of two vibrating levers, whose fulcra are pins " fixed in the bar of the balance, equidistant from the centre " thereof." A small adjustable weight is placed upon the outer end of each vibrating lever. The expansion of the curved pieces " moves those ends of the vibrating levers to which they are " connected in one direction;" the contraction of the curved pieces moves the vibrating levers in an opposite direction, "but " both in expansion and contraction the weights move towards " the centre of the balance."

[Printed, 4*d*. No Drawings.]

A.D. 1858, November 30.—N° 2724.

**LUIS, Jozé.**—(*A communication from Antoine Lepage.*)—(*Provisional protection only.*)—" A watch simplified with anchor escape-" ments & rack, forming a double lever catching in the pinion of " its balance wheel."

"The mounting of this watch is composed of a pallet plate " on which is fastened the whole machinery of the watch, and on " the surface the ordinary dial work of a watch is placed.

"The step is fixed on the axle of the winding up wheel as " well as the dial. On the face is placed the machinery of the " watch.

"The pallet plate forms the principal part of the box, and it is " furnished with two hinges to receive the back of the box and " the rim of the glass.

"A tail piece, with its eye or ring, is added to the pieces above " mentioned. A hollow part in the pallet plate receives the " spring, and serves as immoveable barrel arbor; a wheel placed " beneath turns of itself: to the middle of this wheel a spring " ratchet wheel is fixed by a round axle passing throughout it, " and turning at soft friction.

"When the watch is wound up in the core hole, round which " the spring winds, the two pieces being adjusted together, the " ratchet wheel catches in its wheel, and presents the opening " where the key is placed to wind up the watch on the side of " the dial.

" The watch can be made to wind up at the back if desired."

[Printed, 4*d*. No Drawings.]

A.D. 1858, December 31.—N° 3002. (* *)

**MAUREL, Timoléon Zoè Louis.**—(*Provisional protection only.*) —" An apparatus protracting indefinitely the working of any " mechanism set in motion by springs, more generally applicable " to clock making."

The invention is also applicable to musical boxes. " I propose " to furnish any mechanism motived by springs—a clock for " instance—with a series of small barrels of equal size, turning " in the ordinary manner independent of their axes, and com" municating with each other by wheels of equal diameter; each " of these barrels is furnished with a spring attached by one

" extremity to the drum or cylinder of its barrel, and by the
" other to its spindle, the position of each spring being regulated
" by the number of barrels employed. The shaft of the first of
" these barrels carries at one extremity a handle by which it is
" turned, and at the other a paul and pinion to prevent its
" return, and the shaft of the last barrel carries a wheel by which
" it is connected to the ordinary clockwork. Supposing twelve
" barrels to be used, by turning the handle on the shaft of barrel
" No. 1, I successively wind up the springs of each barrel up to
" No. 12 (I usually place two barrels upon each shaft, excepting
" the first and last, which carry but one), the shaft of which
" carries the wheel gearing on to the ordinary clockwork. The
" clock being set in motion, it follows that as the spring No. 12
" goes down, it is every moment re-wound up by spring No. 11,
" and so throughout the series until all the springs run down
" together. The number of revolutions made by the connecting
" wheel will equal the turns taken by the whole of the springs,
" that is to say, if each spring of the twelve barrels turns eight
" times, the connecting wheel will make ninety-six revolutions
" ere the apparatus runs down. Thus, if the timepiece went for
" one month with one barrel, it would go for twelve months with
" twelve barrels, and so on, according to the number of barrels
" used."

[Printed, *4d.* No Drawings.]

## 1859.

### A.D. 1859, January 14.—N° 123.

**MENNONS, Marc Antoine François.**—(*A communication from Pasquale Perelli-Ercolini.*)—(*Provisional protection only.*)—" A new or improved time measurer."

"The invention consists in applying to the construction of
" time-measuring apparatus, the gradual flow or infiltration
" through porous bodies of fluids in general, and especially of
" air and gases."

For example, a globule of mercury is inclosed in a glass tube, which is closed at each end by a porous diaphragm, and placed in a vertical position. The time of the descent of the globule is noted on the tube by means of divisions and subdivisions that represent hours, minutes, &c. On the completion of the descent of the globule, the tube is reversed, when it again commences to descend, and thereby to register the time. The air enters the tube at the top, and is expelled from it at the bottom. To render the apparatus independent of atmospheric changes, it is enclosed in a sealed tube. "In this state the apparatus may be employed "for the measurement of fractions of time, or of a limited num-"ber of days, hours, or minutes, the descent of the index being "arrested or reversed at will by changing from the vertical to the "horizontal position, and vice versâ. When required for con-"tinuous work, the reversing movement is effected by an auxiliary "arrangement of any suitable kind on the completion of each "course of the index." Other fluids, instead of mercury, may be employed, and the porous bodies, index, and general details may be varied according to circumstances.

[Printed, 4*d*. No Drawings.]

### A.D. 1859, January 25.—N° 233.

**KELVEY, Charles Grant, and HOLLAND, William.**—(*Provisional protection only.*)—"An improved escapement for "chronometers and other time-keepers."

"This invention relates to an improvement on the escapement "for which Letters Patent were granted to George Morton, "bearing date October 17th 1857. According to this plan, two "rollers were applied to the balance staff, the one to receive on "its pallet the impulse from the escape wheel, and the other, by "means of the ruby pin with which it is provided, to control "the motions of a forked lever, which carries the two detents for "locking the escape wheel. Instead of these two rollers, we "now propose to employ but one, so that when the proper rela-"tive positions of the impulse pallet and the ruby or gold pin "are once obtained, no readjustment of the parts (when for "example an accident renders the replacement of the balance "staff necessary) will be required. The impulse pallet is set in "the periphery of the roller as usual, and the ruby or gold pin "for working the forked detent lever stands up from the face of "the impulse roller opposite the flat face of the balance staff, "upon which the impulse roller is fixed. This arrangement "permits of the lever vibrating in a smaller arc than heretofore, "and thus the detents will have a diminished draw out of the "teeth of the escape wheel."

[Printed, 4*d*. No Drawings.]

### A.D. 1859, February 24.—N° 504.

LANÇON, Adolphe, jun.—"A new system of watches."

"My invention consists principally in a new escapement, which "is by simple or dead beat, and its use permits the suppression "of the fourth catching, that is to say, one of the four wheels "which generally form the movement of a watch. I have "attained this object by making a suitable notch or groove in "the axle or staff carrying the balance, and a peculiar form of "tooth upon the wheels, which must act upon the notch so as to "give the impulse or movement to the axle. The notch must be "of sufficient depth, width, and length to permit the divers sets "of teeth to press upon the axle in such wise as to obtain the "desired effect. This notch may be at right angles, but the "teeth act better upon the axle if the angles be made slightly "obtuse. One side of the notch may be sunken, but it is pre-"ferable to make the axles round." The teeth "at acute angle, "known as 'dupleix,' those having the shape of a grain of barley, "and also these latter cut through the centre," are preferred. "The several figures in the drawing shew the different positions "of the tooth of the wheel before, during, and after its action "upon the axle. My new system reduces itself to the preceding "modifications, and to the simple arrangements necessary for "their application, and its advantages are economy of manu-"facture, greater solidity in the watch, good time keeping, and "remarkable facility of readjustment or repair."

[Printed, 8*d*. Drawings.]

### A.D. 1859, March 25.—N° 756.

BAKER, Richard.—"Improvements in chronometers, watches, "and other time-keepers."

This invention relates to an improved chronometer escapement.

"By the present invention the detent is carried by a balanced "lever, which also carries the passing spring; the end of this "lever is prolonged in a curved or other suitable form, and "carries a pin, which enters a circular groove in a block or "disc on the spindle of the balance; the groove is wider than

" the pin, which does not touch it, but as long as the pin is in
" the groove, the lever cannot be moved to such an extent as to
" release the scape wheel; when, however, the pin on the balance
" spindle begins to lift the passing spring, and with it the detent
" lever, the pin on the end of the detent lever enters a notch or
" recess in the side of the aforesaid groove, which thus allows
" the lever to move sufficiently to release the tooth of the scape
" wheel; and the impulse is then given by one of the teeth of
" the scape wheel acting on a pallet in the block or disc on the
" balance spindle. As the balance continues its motion, the
" inclined side of the notch or recess pushes the pin on the
" detent lever back into the circular groove, and thus brings the
" detent back in readiness to receive and lock the tooth of the
" scape wheel, which draws the detent lever against its banking
" pin. The form and arrangement of the parts admit of varia-
" tion, but the action is such that the safety of the timekeeper
" does not depend upon a spring, for the detent is compelled to
" return to its place without a spring or without depending upon
" a spring to effect its return."

[Printed, 6*d*. Drawing.]

### A.D. 1859, April 5.—N° 858.

CRICHTON, Francis Maltby.—" Improvements in clocks or
" timekeepers."

"This invention consists in a new arrangement of what is
" usually termed a 'going barrel,' or toothed spring box, applying
" the power of one only to work both trains. On the arbor of
" a going barrel, at either end of the barrel, but wholly detached
" from it, I place a toothed wheel made to turn freely on the
" arbor against a collet, and firmly attached to the arbor over
" such wheel I place the winding ratchet, and on the wheel
" itself one or more clicks to work with the ratchet. The wheel
" can thus turn freely in one direction on the arbor between the
" ratchet and collet in precisely similar manner to the great wheel
" on a common watch fusee arbor. I pitch the teeth of this
" wheel in connection with the striking train in place of the
" second going barrel, which is dispensed with. In winding the
" clock, the ratchet and clicks work upon the wheel as a fusee
" arbor does, instead of in the usual manner with going barrel

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" movements upon the clock plate. While thus the going barrel " is a continuous motion turning in one direction upon the " arbor, and driving one train, the arbor itself carrying the wheel " pitching with the striking train is always ready to act turning " in the opposite direction. One stopwork only is necessary, " which answers for both trains, and placed in the usual way " upon either end of the barrel."

" By this arrangement, the tension of the mainspring giving " the barrel a tendency to revolve in one direction drives the " clock train, and the same spring giving the arbor a tendency " to revolve in a contrary direction actuates the striking train."

[Printed, 6*d*. Drawing.]

A.D. 1859, April 14.—N° 936. (* *)

**BIRD, THOMAS.**—" Improvements in the manufacture of pickers, " drawing rollers, cop tubes, and steps where lubrication is re- " quired." The patentee says,—"I use the nuts known as the " coquilla nut (attalea funifera) and the vegetable ivory nut " (phytelephas macrocarpa), which from their oily nature require " no additional lubricating matter, a very considerable item in " machinery and manufacturing establishments, the same being " peculiarly applicable to the following purposes :—

" For pickers for looms; by putting a bush made of the said " substance in the tube, bush, or barrel of the picker, which runs " on the spindle, whether the said tube be made of buffalo hide, " wood, metal, or other material; and I make the picker of a " simple T shape, the tube at the top forming the top part with- " out any slot for the picking strap, the picking strap being fixed " round the tube and the centre of the picker; the bush or " barrel may also be bounded with caoutchouc, leather, buffalo " hide, or other suitable substance."

" The said nuts are also applicable for drawing rollers used in " spinning machinery, which will require neither covering on the " outside, nor oiling on the journals.

" For small tubes on which the cops are built on the spindles.

" For pulleys, wharves, cotters, journals, barrels and rollers " for castors, wharves for window or Venetian blinds, tips for " skewers, steps and journals for gas or water meters, steps, " journals, and bushes for time pieces, steps for looms, bearings

" for heald shafting, or other bearings for looms; in fine, for all " steps, bushes, and bearings for machinery where lubrication is " required, provided the same be not required larger than the " said nuts can be found."

[Printed, 6d. Drawing.]

### A.D. 1859, April 21.—N° 1007.

**LEWTHWAITE, Edwin, and AMBLER, George.** — " Improvements in clocks, watches, chronometers, and other time-" keepers."

1st. Improvements in the escapement.—An ordinary lever is mounted on a pivot on the frame of the timekeeper, and acts against banking pins. On the balance wheel " is a piece of metal " which we call a 'table,' same being fixed to the lever " " so as " to move therewith." Half-round pins (acting as pallets) are fixed in the table. In lieu of a pallet wheel a "propeller" is mounted on a pivot, " on which is fixed a pinion, with seven or " any other required number of cogs or leaves, driven by a train " of wheels, the same as an ordinary pallet wheel." The propeller makes four beats in each revolution against the pallets; the propeller may be made in various forms. The effect of temperature upon the pallet wheel is avoided to a great extent.

2nd. Improvements in the fusee.—The driver or first motion wheel is "formed with inverted cogs or teeth, in addition to the " cogs or teeth now thereon, such said wheel to be loose upon " the axis or spindle of the fusee, and gearing with a small pinion " working on a stud attached to the fusee, which gears with " another pinion fixed on the axis or spindle of the fusee." By turning the arbor in a certain direction, the pinion " will follow in " the same direction, carrying with it the thread part of the " fusee;" and the pinion acting upon the teeth of the first motion wheel " will move such wheel in a contrary direction to " that in which the fusee is moving, and by thus operating as a " contrary power, will maintain the going power of the time-" keeper during the time it is being wound up."

[Printed, 6d. Drawing.]

### A.D. 1859, May 25.—N° 1294.

**MALLETT, John.** — " An improved regulator for watches " portable clocks, and timepieces."

"I straighten one end of the balance, pendulum, or regulator
" spring, and act upon it by means of a curb working on a screw
" provided with a square, by turning which with the winding key
" the curb may be moved along the straightened part of the
" spring in either direction, and thereby act thereon and regulate
" the watch, clock, or timepiece with precision."

The above-mentioned screw is pivoted at one end in a stud, in which it may turn in either direction, but is prevented from shifting to and fro by a small screw "working in a groove in the " pivot or smooth part at the end of the screw." The straightened part of the spring is carried through a slot in the curb, a small screw pin at the top preventing the said spring from rising out of the curb. Parallel to the screw a scale is engraved on the watch plate. By applying the winding key to the square, the screw " will be thereby turned to the right or to the left, according as " it may be desired to retard or to accelerate the going of the " watch;" the curb will be consequently moved along the straightened part of the spring "in the required direction and to " the desired extent which it would indicate on the scale; the " spring is acted on by these means, and the regulation of the " watch may be effected by the wearer with ease and minute pre- " cision, the adjustment by my improved arrangement being " necessarily far more exact, and accomplished with more certainty " than by the ordinary mode."

[Printed, 6*d*. Drawing.]

### A.D. 1859, June 11.—N° 1415.

**JAMES, JABEZ.**—"Improvements in obtaining and applying " motive power."

An apparatus for "the raising of clock weights" (amongst other purposes) "where water, steam, or air pressure is available." —A cylinder is furnished with a piston, the rod of which carries a cross head which works in guides between the two sides of an endless chain passed over two notched pulleys; "this cross head " is provided with two palls, which are set in reverse directions, " and gear alternately into the two sides of the chain," so that the said chain travels continuously, thereby rotating the said pulleys. The valve that regulates the inlet and outlet of the water (where water pressure is used) is worked suitably by the cross head by means of a spindle operating in connection therewith; a tumbling lever imparts a sudden movement to the valve at each change.

When applied to the raising of clock weights, "an annular "cylinder may be used," or more than one ordinary cylinder may be employed, "the cylinder or cylinders with the cross head and "palls being contained within a suitable casing, which being "properly weighted constitutes the clock weight itself." The cross head is provided with one pall, and the cylinder or cylinders with another, "the two palls both acting upon one side of "an endless chain carried by a pulley on the main arbour of the "clock; these palls act alternately, and so raise the weights up "the chain. The valves are brought into play on the weight "having descended to a certain distance, when the stop valve is "opened by the aid of suitable tappets, and the apparatus is "then set in motion."

Another part of this invention "relates to an improved mode "of applying the reciprocating motion of the piston of a steam "engine, and dispensing with the crank."

[Printed, 1s. Drawings.]

## A.D. 1859, June 16.—N° 1441.

**HUGHES, Edward Thomas.**—(*A communication from Louis Montanari.*)—"An improved night lamp clock."

A holder, of cylindrical or other suitable form, has in its side a rectangular opening in order to be able to examine the interior. "Within the holder is placed a lamp consisting of a glass tube "or vessel for containing the oil, on which is floated a wick "holder of porcelain or other suitable material, supplied with "a wick of an even or equal substance made expressly for the "purpose, so that a certain depth of oil will be consumed in "a certain interval of time, the lapse of which is indicated by "painting or fixing on the exterior of the tube a graduated scale "or horological table, having a number of horizontal spaces, "each corresponding with the depth of oil consumed in an hour, "so that when the oil has descended from one line to the next, "one hour of time has elapsed, and so on for a consecutive number of hours. The graduated scale on the exterior of the "glass tube may be made of any desired width, but I prefer it to "occupy one-third of the circumference, another third being "clear in order that the lamp may give light, and the other

" third opaque, so as to cause darkness; the said distances " corresponding with the rectangular space in the lamp holder."

The glass tube is supplied with oil to the level of the top line of the scale, so that the gradual decrease of the oil, as it is consumed, can be noted. A number of columns of figures are marked to adapt the lamp to different hours of commencement.

[Printed, 6*d*. Drawing.]

### A.D. 1859, June 17.—N° 1464.

**GUIBLET, Jules Jean Louis.**—(*Provisional protection only.*) —"Improvements in watches."

1st. Winding and setting the hands without the use of a key. —A ratchet-toothed pinion mounted on the fusee axis can be put into gear with the inner teeth of a ring that is mounted upon a lever. The outer toothed edge of the ring gears with a pinion to which motion can be given by a knob projecting from the handle. A tooth on the lever assists to bring the said inner teeth of the ring into gear with the ratchet-toothed pinion.

When it is required to set the hands, a detent throws the exterior teeth of the ring on the lever into gear with a pinion mounted on the minute-hand axis; by turning the driving pinion the hands may be set. Instead of a toothed ring carried by a lever, a spur wheel carried by a lever may be employed. For watches that have no fusee, the tooth is removed from the lever; the lever spring keeps the ring or wheel constantly in gear with the pinion on the winding axis, except when the before-mentioned detent is depressed.

When it is only required to wind the watch the pinion which gears with the ratchet-toothed wheel and with the wheel carried by the lever is dispensed with.

2nd. Actuating the seconds hand.—A toothed wheel that carries the seconds hand is attached to an axis revolving once in a minute by means of a spiral spring. By intermediate wheels, the said toothed wheel gears with an axis carrying a locking arm, which rests against a pinion on the escape-wheel axis, and allows the seconds hand to move only once per second.

[Printed, 4*d*. No Drawings.]

### A.D. 1859, August 27.—N° 1950.

**HANSON, Charles.**—"An improvement in the chronometer " escapement of a watch."

"This invention is intended to simplify the chronometer " escapement of a watch, and to dispense with the two springs " usually employed at that part of the movement. The invention consists in the employment of a pivotted detent acting " upon the escape wheel, which is made elastic in such a manner " and with such power as to dispense entirely with the use of " the two springs ordinarily employed as above-mentioned in " chronometers of the usual construction."

A roller, that carries a notch and a pin, is fixed on the balance-wheel axis. A crescent-shaped detent is fixed upon an arbor, the lower end of which is furnished with an arm, the said arm being acted upon by the above-mentioned pin. The other end of the arm vibrates between two stops. The lower pivot of the detent arbor works in a slotted hole.

On the forward swing of the balance, a tooth of the escape wheel rests against the convex part of the detent. The pin acts against the arm and withdraws the detent from the tooth, thereby unlocking the same. The tooth then passes through the concave part of the detent, and places it (the detent) into the locking position ready for the next tooth. The point of the first tooth passes into the notch of the roller; the tooth is released when the next tooth is locked. On the return swing of the balance wheel, the pin pushes the lower end of the detent arbor outwards "till " the said pin has passed the end of the detent arm, when the " pressure of the escape wheel on the detent immediately returns " the detent and arm to their former position."

[Printed, 6*d*. Drawing.]

### A.D. 1859, August 31.—N° 1982. (* *)

FLEMING, Gilbert Stanton.—(*Provisional protection only.*) —" Improvements in candles, for the purpose of indicating " time, and the facility of lighting the same." These are, first, making marks on the candles, " the marks to consist of hours, " half-hours, and, if necessary, quarter-hours, the distances to be " determined by the kind of candle used for that purpose." The marks may " be made either in the process of manufacture or " after."

Second, " applying a composition of phosphorous or other " igniting material to the top ends of the wicks."

[Printed, 4*d*. No Drawings.]

A.D. 1859, October 28.—N° 2469.

**COLE, James Ferguson.**—" Improvements in timekeepers."

1st. "The anti-detached or repellent lever escapement."—The locking angles on the pallets are made " with angles lying out-" wardly from the dead rest circle, as in a line or plane of action " projected from the locking corner of each pallet respectively at " such an inclination as will cause the pressure of the escape " wheel teeth to produce a contrary or reverse action of the " pallets and lever, as compared with the action produced on " ordinary detached lever escapement pallets by the pressure of " the wheel teeth in such escapements."

The said "reverse action" may also be produced by angular " faces on the wheel teeth, either by round, half-round, or flatted " cylindrical pins, or by movable rollers for the wheel teeth to act " upon." The acting end of the lever is pointed, so as to work in a recess made in the cylindrical "roller," and thus to give impulse to the balance wheel. The surface of the roller is the banking for the repose action of the lever.

2nd. "The anti-detached chronometer escapement."—The teeth of the escape wheel act directly upon a roller or cylinder on the balance axis. The roller has a notch in it, which at the proper time receives a tooth of the escape wheel, and thus enables the balance wheel to be impelled. To prevent the momentum of the balance from being checked by the escape-wheel teeth, a short linear steel spring, carrying an angular ruby pin or pallet, causes a certain amount of pressure on the said teeth. This "retention " spring" may be employed in other escapements.

[Printed, 8*d*. Drawing.]

A.D. 1859, November 4.—N° 2518. (* *)

**CHESTERMAN, James.**—" New and improved methods of and " furnace for heating, hardening, and tempering clock springs, " watch springs, band saws, steel for dresses, such as crinoline " steel, and other like purposes."

The furnace is made by fixing an iron tube or tubes in a casing of brickwork, or chambers are formed by putting together plates made of metal or earthenware, or boxes are used having grooves, forming tubes through which the steel is, or articles of steel are, passed to be heated. From thence the heated steel is passed through cold plates or hardening fluid to harden it. In some cases instead of cold plates liquid lead may be used, or oil or other liquid bath " to harden the steel." After being hardened, the steel is conveyed back over the top of the furnace, where it is heated by the waste heat of the furnace and tempered.

[Printed, 10*d.* Drawing.]

A.D. 1859, November 8.—N° 2542.

**JOHNSON, John Henry.**—(*A communication from Merrick Price.*)—" Improvements in watches or timekeepers."

This invention " relates to a peculiar construction and arrange- " ment of watch or timekeeper, wherein an independant seconds " hand is capable of being stopped or set in motion as desired, " without in any way interfering with the ordinary train of wheel- " work of the watch or timekeeper. According to this invention, " the independant seconds hand is driven from the same main- " spring which actuates the going train of the watch (supposing " it to be applied to a timekeeper of that class,) and on its axis, " which is of the tubular kind, so as to revolve outside of and " concentric with the hours and minutes hands, is fitted loosely " a spur wheel. This wheel is driven either from the ordinary " seconds hand or by other trains of wheels, and is constantly " revolving so long as the watch is going. To the under side of " the wheel last referred to are fitted two or more springs, which " grip the tubular axis or arbor of the independent seconds hand, " and transmit a rotatory motion thereto from the wheel by simple " frictional contact alone, provided there is not too much resis- " tance offered by the arbor itself. The upper part of this arbor " turns in, and is supported by a forked lever arm, which turns " on a centre, and projects slightly outside the casing of the " watch. By moving this arm in one direction or the other, its " forked end in which the arbor turns will either put a certain " amount of pressure or friction upon the same enough to over- " come the friction of the springs in the spur wheel, and thereby " stop its movement, or it will release it from undue friction, and " allow it to rotate freely under the frictional action of the " springs."

[Printed, 8*d.* Drawing.]

A.D. 1859, November 22.—N° 2644.

**NEWTON, William Edward.**—(*A communication from Henry Boehm James.*)—" Certain improvements in obtaining compensa- " tion for the effects of changes of temperature in timekeepers."

Controlling the active length of the hair spring " of a watch " or other timekeeper governed by a balance wheel, or of the " pendulum rod of a clock, which is governed by a pendulum."— " Combined laminae of brass and steel or other metals which " expand and contract differently with the same changes of tem- " perature," " are applied to that end of the spring or rod which " has heretofore commonly been fixed, and the metals are adapted " thereto in such a manner that by their expansion and contrac- " tion they will cause the spring to be taken up through its curb " pins; or in the case of clocks the pendulum rod will be taken " up through its stud, as it (the spring or rod) expands with an " increased temperature, and it will be let out as it contracts with " a reduction of temperature."

It is preferred " to coil the combined laminae of metal into a " convolute spiral form, and to attach the inner end of the " coil firmly to one of the plates, which hold the movement, and " either to attach the end of the hair spring or pendulum rod to " the other end of the coil, or to a bar or lever against which that " end of the coil acts in such manner as to cause the said bar or " lever to move with the expansion and contraction of the coil " produced by changes of temperature, and so to take up or let " out the spring or rod."

[Printed, 8*d*. Drawing.]

### A.D. 1859, December 3.—N° 2735.

**RUSSELL, Thomas Robert.**—" The application of a certain " metal for the movements of watches and other timekeepers."

" I make or manufacture the movements, or part of the move- " ments, of watches and other timekeepers of nickel, and of the " same metal alloyed, instead of the various metals and materials " hitherto used; and I claim as my invention, and which to the " best of my knowledge and belief has not been hitherto used " within the realm, the application of nickel metal, pure or " alloyed, for the making or manufacturing of the movements " of watches and other timekeepers."

[Printed, 4*d*. No Drawings.]

### A.D. 1859, December 19.—N° 2890.

**HITCHIN, David.** — " An improvement in the caps of " watches."

*This invention* " relates a novel mode of constructing the caps

" of watches, whereby they will be enabled the more effectually " to exclude dust from the works. The improvement consists in " letting into the opening in the metal cap above the balance-" wheel a piece of flat or dome-shaped glass which will permit of " the works underlying the glass and also of the jewels in the top " plate being inspected without removing the metal cap, the " attachment of the metal cap to the plate is effected in the " ordinary or any convenient manner."

The drawings show a plan, a side view and a cross section of one of the "improved transparent dome caps."

The glass is fixed or secured " in the metal frame in the same " way that an ordinary watch glass is usually secured in its " frame."

[Printed, 6*d*. Drawing.]

### A.D. 1859, December 28.—N° 2966.

PEPPÉ, George Tosco. — " Improvements in apparatus for " keeping time."

An annular or spiral-shaped gutta percha tube " is mounted on " and turns with an axis on which there is a pointing hand which " points to a graduated fixed dial." "The two ends of the " hollow ring or spiral are connected together by a tube, in which " is placed cotton or other suitable material, such as will allow " water or other liquid to filter through gradually." A small quantity of mercury is in the interior of the said ring, the rest of its interior being filled with water. A cord is wound round a pulley on the axis of the ring, and is weighted so as to tend to rotate the axis "in the opposite direction to that in which the " mercury tends to settle down to the lowest point or part of the " hollow ring in which it is contained. By this arrangement the " mercury will be constantly forcing the other liquid to filter " through the parts where the two ends of the ring or spiral are " connected, and have interposed between them filtering or " porous matters, and the requisite adjustment is obtained by " applying additional or removing part of the weight which is " suspended to the cord or chain." In some instances the porous matters are applied at each end of the tube, which is placed in a case; the case is filled " with a like liquid to that employed in the " ring or spiral with the mercury, by which means air is more " readily prevented being enclosed in the ring or spiral."

[Printed, 4*d*. No Drawings.]

### A.D. 1859, December 29.—Nº 2973.

**RUSSELL, Thomas Robert.** — "The application of certain "metals or materials to the manufacture of the movements of "watches and other timekeepers."

"In place of the various metals and materials at present "employed for the movements of watches and other timekeepers, "I make or manufacture the said movements, or parts of the "same, of pure gold, silver, German silver, platina, zinc, and "tin, and of any of these metals alloyed, but known in the "market by the above-mentioned names; I therefore claim as "my invention, and which to the best of my knowledge and "belief has not been hitherto used within the realm, the application of the following metals or materials, viz.: gold, silver, "German silver, platina, zinc, and tin, pure and alloyed, for "making or manufacturing the movements of watches and other "timekeepers."

[Printed, 4*d.* No Drawings.]

## 1860.

### A.D. 1860, January 12.—Nº 83.

**FERRIER, Eugene.**—(*Letters Patent void for want of Final Specification.*)—"A new clock."

The weight of the clock is used "as a prime mover," the wheelwork being enclosed "in a sphere sliding on a rod, which traverses "through it." The rod "is provided with a rack adapting itself "to a pinion, upon which it acts either in descending or in re-"ascending," "and the pinion in its rotatory motion gives the "motion to the wheelwork of the clock. The size of the teeth "of the rack and pinion are regulated conformably to the weight "of the clock, so that the descent of the sphere may take place "in an uniform and regular manner, that is to say, allowing a "certain number of teeth to come into gear within a certain and "fixed space of time."

The clock is wound up by raising it to the top of the rod. To regulate the clock, one end of a rod "is fixed to the regulation

" piece;" this rod can be turned to the right or to the left by means of a key.

A calendar may be adapted to the spherical clock. "The clock " performing the same downwards motion every day covers the " same space of rod every day, and if everything being so regu- " lated as to give the clock 31 days for its descent, the rod is " divided into 31 equal parts; the sphere will cover one of these " divisions at every revolution of 24 hours, and will consequently " leave uncovered a new figure every day."

[Printed, 4*d*. No Drawings.]

### A.D. 1860, January 18.—N° 135. (* *)

**MAILLARD, NICHOLAS DORAN.**—" Improvements in the means " for steering and indicating the course or direction and time of " ships and other navigable vessels at sea, which improvements " are also applicable to other purposes."

1st. " A barrel spring and train of wheels suitably arranged to " give the required motion to a vertical or horizontal spindle; a " hand or indicator is fixed at the end of the spindle to indicate " the bearing of the sun by means of a fixed card or dial, on " which the divisions or points of the mariner's compass and also " the hours, minutes, and seconds are marked, to show in time " the variations of the sun's bearings throughout the day and " night, and there is also a dead hand or pointer on the dial to " mark the latitude of the ship or place."

2nd. By means of suitable gearing, motion is communicated from the vertical shaft of a ship's rudder to a spindle passing through a fixed compass card in a binnacle, thus indicating—by means of one or more hands—the course or direction of the ship's head.

In either of these improvements "the compass card may be " attached to a hollow spindle passing over the other spindle, and " such hollow spindle and card may be put in motion by means " of power communicated thereto from the ship's rudder."

The second of these improvements may also be applied to surveying and other instruments, by running a wheel at the other end of the spindle along the ground, thus indicating the course or direction of the instrument on the card " by the hand which " has been previously set to the true north."

[Printed, 6*d*. Drawing.]

### A.D. 1860, January 21.—Nº 158.

**VIVIER, OCTAVE.**—"Improvements in keyless watches."

1st. In connection with a milled head on the pendant of the watch, a bevil pinion "engages in a toothed wheel on the plate of " the watch, and a pinion on the said wheel engages with two " other and smaller toothed wheels." The latter "are carried by " a plate which turns about the same axis as the first-named " toothed wheel." By slightly turning the plate, "one of the " said wheels may be thrown into gear with the fusee, and the " watch may be wound by the milled head on the pendant of the " watch." Another motion of the plate enables the hands to be set. Studs, on the edge of the watch, respectively enable either the winding or the setting of the watch to be accomplished.

2nd. "The mechanism for acting on the hands, and that for " winding the watch are on opposite sides of the watch," but both are "worked from the same axis, turned by a milled head." " An arm turning upon one end of the axis, carries a pinion " which by the motion of the said arm may connect the toothed " wheel at the same end of the axis with the hands. An arm " near the other end of the axis, and turning upon the said axis, " carries a pinion gearing into a pinion carried at the same end of " the axis. By the motion of the said arm the said pinion may " be made to connect the said axis with the fusee. The mechanism for winding is brought into operation by means of a " sliding stud on the edge of the watch, and the mechanism for " adjusting the hands is brought into operation by pressing a " spring stud also on the edge of the watch."

[Printed, 6*d*. Drawing.]

### A.D. 1860, February 2.—Nº 272.

**REDRUP, GEORGE.**—(*Provisional protection only.*)—"Improve- " ments in the means of and apparatus for obtaining and " applying motive power whereby perpetual motion may be " obtained."

This invention may be applied, amongst other purposes, "to " clocks or timepieces." The inventor applies it, "modifying it " if necessary with or without fluids in lieu of the pendulum; " thus a clock or timepiece would not require winding up."

This apparatus consists of a small cylinder, attached (by means of an elbow) to a larger cylinder, on which is the fulcrum of a lever. The piston of the large cylinder is attached to the short arm of the lever. At the extremity of the long arm of the lever a weight is fixed, "which will impart considerable pressure to the "piston" of the large cylinder. The small cylinder carries a piston and piston rod, the stuffing box of which is fixed on the said elbow. A rotary motion is thus obtained, the said piston being furnished with a connecting rod and crank. Other levers are also employed, "with the short end placed close to the end or "weight of the lever attached to the cylinder so that a small "weight applied at the long end of the under lever will raise "both the weight and the lever which are attached to the cylinder, "and which when raised takes off the pressure from the piston. "These levers are acted upon by certain parts of the machinery "when in motion."

The machine being charged with "a proper quantity" of fluid, the pressure is removed from the large cylinder by the action of the said levers upon the weight. The pressure is then applied. When the piston and small cylinder have moved, the machinery will take off the pressure therefrom by the levers, and will put the whole pressure on the other cylinder, which forces "the small "piston back again." "The machinery before mentioned acting "upon the levers reverses the pressure, as before, so that a "continual or perpetual motion is kept up."

[Printed, 4*d*. No Drawings.]

### A.D. 1860, February 3.—N° 280.

WATKINS, ALEXANDER.—"Improvements in timekeepers."

1st. "The pillar plate to which the dial is fixed is made solid, so "as to form a complete disc," "thereby obviating the necessity "for several separate parts ordinarily required to carry the "movement."

2nd. A tapered mainspring is combined with, and fixed within a barrel, "which has a toothed rim acting in the pinion of the "centre wheel, and is on a plain arbor." This arrangement equalizes "the force communicated to the train by the spring "without the aid of the ordinary chain and fusee."

3rd. "A safety click, in which the head of the click rests "against a fixed stop so as to relieve the spring of the click "from the pressure caused by the action of the mainspring."

4th. "The use of an escapement, the two pallets and the other "arm of which are of equal lengths; and also the arrangement

" of the escapement in connection with the balance and the " escapement wheel, so that the pivot of the escapement, and the " axles of the balance and of the escapement wheel shall be in " one straight or direct line."

5th. "The compound regulator, in which a toothed pinion " moved by an index lever acts upon a toothed segment fixed at " the end of the arm of an ordinary regulator, so as to obtain " greater nicety in the adjustment of the regulator."

[Printed, 6*d*. Drawing.]

### A.D. 1860, February 8.—N° 330.

**DALGETY, ALEXANDER.**—" Improvements of watches, clocks, " and chronometers."

1st. A simple dead beat escapement.—A steel balance axis, with certain openings or notches therein, is used in connection with a crown escape wheel. "For a short distance below the " collet or bos, on which the balance is fixed the axis or staff is " either partly or half cut through so as to leave a polished flat " surface, and its opposite side (near the bottom pivot) is also " cut away in a similar manner." "Each tooth as it drops will " first fall on the cylindrical part of the vibrating axis, and after- " wards pass off at the flattened side."

"The same result may be obtained by cutting a notch or open- " ing at each end of the staff, or distinct cylindrical pieces may " be fixed thereon, each containing a notch or opening in its " side."

2nd. "Placing the movement or works air-tight, or nearly so, " in their cases by means of suitable elastic packings between " the hour wheel and face, and also round the arbor by which " the barrel or fuzee is wound, and likewise bringing such arbor " (squared at its end in the usual way to receive the key or winder) " through the pendant or bow of the case. The expense and " necessity of a double back is thus avoided, and the cost of " material and labor again considerably lessened; the dust and " dirt is thus prevented entering, and the oil consequently retained " for a much longer period in a fluid state."

[Printed, 6*d*. Drawing.]

### A.D. 1860, February 18.—N° 450.

**SANDERS, JOHN.**—" Certain improvements in watches."

"This invention consists in the adaptation to watches of certain

" mechanism for effecting the following objects:—First, for " setting the hands of watches from the outside or case of the " watch, instead of opening the watch, as heretofore commonly " practised; secondly, for winding up the mainspring of watches " without opening the case thereof; thirdly, for stopping and " starting watches."

To set the hands, a lever is furnished, at its internal end, with a click which acts upon the dial wheels of the watch; the external end of the lever "passes through the edge of the watch case for " imparting motion to said click."

To wind up the mainspring, a lever (" let on to the mainspring " arbor or fuzee arbor") " is furnished with a click taking into " the ratchet of the mainspring, and the lever passes through " the edge of the case of the watch for imparting motion " thereto."

To stop and start the going parts of the watch, a " stop and " impulse movement" is employed. A lever, in the pendant of the watch, is locked when not required for use, but may be made to act upon the balance wheel for stopping the same. When the watch is started, a sliding tailpiece impels the balance.

In winding up the mainspring of a fusee watch, the lever is placed loosely upon the arbor of the fusee; the click is thus kept out of the teeth of the ratchet wheel while the watch is going, and the fusee is allowed " to move round freely as the chain is drawn " off the same by the action of the mainspring."

[Printed, 8*d.* Drawing.]

### A.D. 1860, February 23.—N° 486. (* *)

**MAPPLE, Daniel Moore.**—(*Provisional protection only.*)—" Improvements in electric clocks and electric batteries."

" The improvements in electric clocks relate to the manner of " working the impulse weight by which the impulse is given " at proper intervals to the pendulam of the clock. The impulse " weight lifted by the action of an electro-magnet is brought " to a position in which it is retained by the operation of a per- " manent magnet; an electro-magnet is caused to release the " weight from the action of the permanent magnet, and to allow " it to impinge upon the pendulam with a constant and regulated " impulse."

[Printed, 4*d.* No Drawings.]

### A.D. 1860, March 24.—N° 767.

**NEWTON, William Edward.**—(*A communication from Wait T. Huntington and Henry Platt.*)—" Improvements in calendars " for clocks or other timekeepers."

This invention " relates more particularly to the mechanism " through which the clock or timekeeper effects the variable " movements of the index for the day of the month, and the index " for the name of the month of the calendar, which variable " movements are rendered necessary by the variations in the " length of the month in a quadrennial period."

The principal features of novelty are :—

The employment of a day-of-the-month wheel, " having thirty- " one teeth, three of which are shorter in various degrees than the " other twenty-eight ;" this wheel operates " in combination with " a detent," controlled so " as to enter to different depths into " the said wheel, according to the number of days in the month."

" The operation of the day of the month wheel is effected by " means of a cam which acts on a lever, which by means of a " lifting rod actuates a detent lever and click." The operation of the day-of-the-week wheel is effected in a similar manner.

Rotating cylinders, opposite to openings, are used to indicate the days of the month and of the week respectively.

A variable upward movement of the click over the teeth of the day-of-the-month wheel is provided for, so that the retaining power necessary at the end of the shorter months may be acquired.

The operation of the detent " which regulates the distance of " the movement of the day of the month wheel," " is controlled " by means of wheels with projections and depressions of different " elevation or depth on their peripheries, according to the number " of days in the month."

[Printed, 1*s*. Drawing.]

### A.D. 1860, March 29.—N° 819.

**JOHNSON, John Henry.**—(*A communication from Louis François Clément Bréguet.*)—(*Provisional protection only.*)—" Im- " provements in chronometers."

" This invention relates to a mode of regulating chronometers, " and to certain peculiar self-acting compensating arrangements."

The balance is enclosed in a close metal chamber or bell, provided with suitable air holes; these are capable of being more or less opened or closed, for "the less freedom imparted to the air " in the bell, the slower the chronometer goes." The said opening or closing "may be effected either by adjusting screws or " levers, or in a self-acting manner by the action of the varying " temperature of the air upon the plate to which the bell is " attached, the latter arrangement serving as a compensator."

In another mode, the balance is made on the same principle as the compensating pendulum; or a number of radial arms may be provided, at their respective extremities, with a second arm extending inwards towards the centre, and composed of some other substance of different expansive powers.

To regulate chronometers, a self-acting apparatus is made to operate "upon the spring balance so as to shorten the same;" a blade, composed of two metal plates, "say of copper and steel " respectively," is provided at the extremity with a stop, "placed " in such a position as to bear upon the balance spring when the " blade is deflected by the unequal expansion of its metals."

[Printed, 4*d*. No Drawings.]

### A.D. 1860, April 12.—N° 914.

**DRUKKER, Meyer.**—"Improvements in clocks."

A timekeeper, an alarum, and a calendar are combined in one apparatus, "which shows the time of the day and the day of the " month by a series of hands or indicators working upon one " centre." This is effected "by hollow spindles of different dia" meters, working one within the other upon the same centre, to " which are attached the wheels and pinions necessary for com" municating the required motion, whether that motion be pro" duced by springs or by weights, or by any other means."

The hollow spindles or tubes of different diameters are upon the centre pivot, and are "combined by necessary means to the " different wheels in connection with the movement of the clock " or timekeeper." These hollow spindles or tubes are respectively, by any convenient means, "in combination with the necessary " indicators or hands of a clock or timekeeper, and the index of " the scale of an alarum." The dial has three different circles, one for the minutes and seconds, another for the hours, and a third circle for the day of the month. Each circle has its respective hand; one works round the dial plate every hour, "another, "together with the index of an alarum, every twelve hours," "and another once a month."

[Printed, 4*d*. No Drawings.]

### A.D. 1860, April 16.—N° 953.

CARPENTIER, Jean Baptiste Auguste.—"A new metrical "apparatus with table."

"The present invention consists of a box containing a "collection of models by means of which the weights and "measures of any country can be practically taught. It consists "of a receptacle of wood or other material, according to fancy, "having a lid opening so as to form a table on which the different "objects may be placed when required for illustrating. The lid "or door is rendered more solid by means by means of resting "hinges; the interior of the receptacle is divided into compartments, in which the various models are placed when not "required. A rod of iron or other material is adjusted at the "top, so as to slide in and out, and acts as support for the scales; "the lid can be closed by a lock or not, as required. To aid in "moving the receptacle a handle is placed on each side; when "required for use it can be placed on a table or hung on the "wall, being furnished with a ring at the top. At the lower "part, on the right hand side, a drawer is arranged for holding "shot, which serves in illustrating the weights and measures."

Amongst the objects contained in "the receptacle" is "a clock "dial used in illustrating the time."

[Printed, 6*d*. Drawing.]

### A.D. 1860, May 19.—N° 1231.

STEVENS, Charles.—(*A communication from Curé Valla.*)—(*Provisional protection only.*)—"Improvements in striking "clocks."

"For a striking clock with pendulum & weights all the striking "work is suppressed except the snail, the scale, the stay of the "scale, and the fork-shaped detent falling at the hours and half "hours." "The striking work has two levers without cog work, "and consists of the following pieces:—A wheel with eight pins "moved by a weight;" "the hammer lever acting on the hammer "by means of an iron rod, and connected with the pin of a "wheel;" "an escapement lever with unequal arms, the shortest

" of which is connected with the pin above mentioned, & the " large one with a detent;" "a pin placed near the centre of " rotation communicates with the moveable end of the detent " lever;" "a lever striking on the stay of the scale;" "a moveable counterweight;" a small iron rod, which raises "the scale " one notch at each stroke of the hammer lever; a third lever " moving three-fourths of the distance from one pin to the other, " and a fourth lever performing half the distance, so as to catch " in when the opposite one is about to escape. In the working of " the above pieces the fly wheel is carried from right to left, now " simultaneously, now separately, by each of the levers drawn on " its axis by small weights. The third lever causes the hammer " to move, striking the hours, and the fourth lever is stayed at a " part of the detent as soon as the end of the arm is met by the " inner stop of the clock."

A method of striking the quarters, with a second wheel and two levers, is mentioned.

[Printed, 4*d*. No Drawings.]

### A.D. 1860, May 21.—N° 1251.

NEWTON, WILLIAM EDWARD.—(*A communication from C. B. Hoard.*)—" Improvements in the mode of and apparatus for " winding clocks or other time-keepers."

The said timekeepers are actuated by " a spring without chain " or fusee."

" The invention further consists in connecting with the spring " of the clock an arrangement of mechanism, consisting principally of a fan or vane wheel mounted on a suitable axle and " deriving its motion from currents of air. By the rotation of " this vane wheel, on the axle of which is a toothed pinion, " power may be applied to the spring of the clock or time-keeper " so as to wind it up, while at the same time the spring is giving " motion to the mechanism of the clock. The vane wheel or fan " is enclosed within a casing or pipe open at both ends, and so " arranged that a draught or current of air may be made to pass " through it, and thereby actuate the fan or vane wheel."

The difference between the temperature of the air in the room into which the said casing or pipe leads and the external air causes a current of air to impinge on the vanes of the fan wheel and thereby to wind up the clock.

The fan wheel "may be arranged so that the current of air on "passing through or impinging on the vanes of the wheel from "either side, will cause it to turn the arbor around which the "spring of the clock is wound always in the proper direction to "wind up the spring."

[Printed, 6*d*. Drawing.]

### A.D. 1860, May 23.—Nº 1271.

**BURNETT, William Hickling.** — "Improvements in electric "telegraphs and in apparatuses employed therewith, a part of "which improvements is applicable to the winding of clockwork."

The 1st, 3rd, 4th, 5th, 6th, and 7th parts of this invention refer to electric telegraphs and apparatus employed therewith. The 2nd part of the invention relates "to an improved mode of maintaining "in action the said apparatuses, which mode is also applicable to "clocks, and generally to those telegraphic and other instruments "in which clockwork is used."

The "improved mode of maintaining in action the said "apparatuses and other clockwork is, by causing a local battery "to keep a weight or spring constantly wound by means of "electricity; I prefer a continuous step-by-step motion caused "by a series of attractions of an electro-magnet. This step-by-step "motion has been already applied to drive electrical apparatus "directly, whereby of course the wheels were moved with a "fitful jerking advance; but I use any arrangement by which a "weight or spring may be constantly kept wound without "preventing its simultaneous action upon the moving parts (as "is the case in most clocks and watches whilst they are being "wound), and thereby to get a smooth regular motion in the "wheelwork, and at the same time prevent the necessity of "frequent winding by hand."

An advantage "in using a spring instead of a weight is that by "means of a key," on the square part of the axis to which one end of the spring is attached, the strength of the spring can be varied "during the adjustment of the normal speed."

[Printed, 9*s*. 2*d*. Drawings.]

### A.D. 1860, June 22.—Nº 1515. (* *)

**MORRIS, William, and MAPPLE, Henry.** — (*Provisional protection only.*)—"Improvements in apparatus for electric clocks "and telegraphs."

" 1st, causing the impulse weight or spring to give its impulse " to the pendulam when the pendulam is moving in the direction " of the impulse.

" 2nd, causing an electro-magnet which gives motion to the " train of a clock to raise the weight or spring which gives impulse to the pendulam." In this arrangement only one electro-magnet is used.

" 3rd, placing a stop on the handle of a telegraph instrument," " which at each to-and-fro movement of the handle strikes " against an elastic buffer."

" 4th, making the soft iron piece that swings on the staff pivots. " of such a form at the end near the permanent induction magnet, " and so placing the piece as to cause the attraction of the induc- " tion magnet partially or wholly to bear up the weight of the " piece and staff, and to retain the staff in a proper position " pressing gently towards one end or point.

" 5th, making the supporters of the insulators on telegraph " posts of one piece, spanning or grasping the post, so as to carry " several insulators with few bolts or borings.

" 6th, uniting the metal support pieces to earthenware insu- " lators by imbedding them in the insulators at the time of " making.

" 7th, imbedding pieces of graphite, plumbago, charcoal, coke, " or other carbonic substances, to form one pole of a battery in " the surface of a vessel of glass, clay, slag, or earthenware, when " in a plastic state, so as to contain the acid."

[Printed, 4*d*. No Drawings.]

A.D. 1860, June 26.—N° 1555. (* *)

PEPPÉ, GEORGE TOSCO.—"Improvements in apparatus for " keeping time, for weighing letters, and other matters, and for " levelling."

This invention consists of the application of "a hollow ring on " a glass disc" in constructing a timekeeper, a level, and a " weighing machine." Manufacturing the glass disc with a hollow circumference. A partially flattened glass globe is opened and "still further flattened by flashing," &c., until the margin of the opening will allow for the formation of a hollow ring, by pressing and turning inwards, the edge being then made to attach itself to the disc all round. Another method of manufacture is to make the central portion of the sides to adhere, leaving a hollow ring at the circumference. A third method consists of dropping it into a mould and effecting the adhesion of the sides by means of a piston.

"To construct a level with the glass disc."—Two unmiscible fluids, of different specific gravities, one coloured and one uncoloured, may be placed within the hollow circumference, by means of a small hole bored therein, the whole of the cavity being filled. When one fluid only is used, it should be coloured or opaque, as mercury; about half the hollow should be filled, and the hole then carefully sealed. All the objects intersected by the line joining the two fluid surfaces stand upon the same level as the eye of the observer. By attaching a graduated arc to one part of the limb of the disc, angles of altitude may be measured.

For keeping time and weighing letters the disc is mounted on a horizontal axis. A weight hung to the axis, and an orifice to allow the fluids to pass is used in the timekeeper. In the weighing machine, the hollow circumference is half full of one coloured fluid, and a pulley, with a loaded index hand and carrying the scale pan, is mounted on the same spindle as the disc.

[Printed, 10*d*. Drawings.]

### A.D. 1860, July 2.—N° 1588.

**GONTARD, Célestin Philippe.** — "Improvements in re-" montoirs for winding-up and setting right watches without " keys."

In watches made according to this invention, the setting right of the watch is independent of the winding up.

In the winding mechanism, a pinion, "carried by a spindle " running through the holding button" and actuated by a thumb wheel fixed on the external end of the said spindle, works " an intermediate double-toothed wheel, which causes the barrel " spindle to rotate." Three separate arrangements of the said pinion are described and shown. The teeth of the intermediate double-toothed wheel and of its leading pinion are inclined in a peculiar manner so as to afford a " solid gearing."

In the mechanism for setting the hands, a rod, at the external end of which is a button that projects outside the edge of the watch, is drawn outwards, thereby bringing a pinion on the inner extremity of the rod into gear with an intermediate wheel that impels the minute wheel; whilst the rod is in this position, the said button is turned round and the hands are set. By this arrangement the hands of the watch may be moved either way. "The part of the spindle used for working this setting right is "put in its place only when all the other parts of the movement "are in the watch case."

[Printed, 8*d*. Drawing.]

A.D. 1860, September 14.—N° 2234.

HALL, NATHANIEL RICHARD.—(*Provisional protection only.*)— "Improved apparatus for winding up clocks or timekeepers."

Clocks may be wound up by the opening of the door of the apartment in which they are fixed. Upon the end of the shaft of the mainspring or axis of the weight lines grooved pulleys are secured. The said grooved pulleys are "provided with teeth or "pawls upon the sides thereof, taking into ratchet wheels "mounted upon the same axis, to which motion is communicated "upon the opening of the door through the medium of a connecting line, cord, or other suitable contrivance, one end of "which is wound round and attached to the said pulley wheels, "whilst the other end is secured in any suitable position to the "door in such manner, that upon the door being opened the "cord or otherwise may cause the said pulleys, ratchet wheels, "and shaft or axis to revolve, and thereby wind up the clock, the "said pulleys being caused to revolve in the contrary direction, "and to return to their original position upon the closing of the "door, by means of springs or other ordinary reacting mechanism "in connection therewith, and the clock prevented from being "overwound, by the employment of stops, against which the "weights or otherwise impinge and throw the teeth or pawls upon "the pulleys out of gear with the ratchet wheels upon the clock "being fully wound up. The said line, cord, or other contrivance "may in like manner be actuated by means of a gate, turnstile, "millwork, steam, or other motive agency."

[Printed, 4*d*. No Drawings.]

A.D. 1860, October 8.—N° 2437.

JOLLY, LOUIS JULIEN OLIVIER.—(*A communication from Felix Berthet.*)—"Improvements in the means of winding up and "setting watches."

"The object of this invention is to wind up and set watches " without having to open them, or to use keys for those pur- " poses. According to this invention certain of the working " arrangements are so combined that they can be shifted alto- " gether according as required, in order to wind up or set the " watch, instead of having to throw the wheel acted on off its " centre, or to displace its axis separately, or by itself, to bring it " into and out of connection." The mainspring is acted upon to wind the watch and the hands to set the watch "by means of " one and the same pinion or actuating contrivance worked from " outside the watch." A lever, beam, bar, plate, or piece is "so " moveable or so working on a centre or fulcrum, or so centred " or fitted, that its ends alternately may be raised and depressed, " that is to say, it may be raised at one end while being depressed " at the other, and vice versâ, according as it is desired to act on " the mainspring for winding up the watch, or on the hands for " setting it."

The drawing shows a watch which is acted upon, for the above purposes, by a knob at the outer end of a spindle that passes through the button of the watch. To bring the above-mentioned plate into such a position that the proper wheel (of the two wheels that are centred upon the said plate) can gear into the train of wheels for setting the hands, a knob, projecting from the edge of the watch case, is depressed.

[Printed, 8*d*. Drawing.]

### A.D. 1860, November 2.—Nº 2681.

**WILLIAMSON, HENRY**, the younger. — "Improvements in " silver watch cases."

This invention "relates to the combination of gold and silver " in the manufacture of silver watch cases, and consists in inlaying " and making parts thereof of gold." These inlaid and other parts of gold are formed of ornamental design; they "may be flush, sunk, " or raised above the other surfaces of silver, and engine-turned, " engraved, or otherwise ornamented as may be required."

In carrying out this invention, one or more recesses are sunk in the watch case; these recesses are made "to represent flowers, " birds, an escutcheon, or garter, or other suitable devices or " designs." Like designs of gold are formed to fit into the said recesses, "so as either to fill them up flush with the surface of the

" watch case or they may be sunk a little below or raised above " the surface." The gold pieces are soldered into the recesses with hard solder; soft soldering will answer the purpose if the case is not subjected to great heat. The devices are engraved so as further to carry out the design. " Instead of positively inlay- " ing the gold the recesses might be cut through the cases, and " the devices in gold inserted from the back, and if necessary " backed up with a plate on the inside; or, further, the design in " gold may be soldered to the exterior of the case, so as to " appear in relief and be further ornamented by engraving or " otherwise."

[Printed, 4*d*. No Drawings.]

### A.D. 1860, November 8.—N° 2756.

AITKEN, John. — (*Provisional protection only.*)— " Improve- " ments in clocks."

This invention " is more particularly adapted for turret or " other clocks where the necessary depth or amount of space for " the length of the pendulum cannot be conveniently obtained."

" According to this invention the back fork or crutch, which " imparts momentum to the pendulum, is fitted on the pallet " arbor with the crutch extending upwards or in a direction " reversed to which it has been hitherto employed. The crutch " is prolonged beyond the pallet arbor in a downward direction " to serve as a counterpoise weight, keeping the upper part in a " vertical or balanced position, and so that it will not fall over " either to the right or left until acted upon by another force. " The point of suspension of the pendulum is raised at least " the length of the upper part of the crutch above the crutch, " and consequently places the point of suspension at least twice " the length of the crutch higher than in the usual way."

[Printed, 4*d*. No Drawings.]

### A.D. 1860, November 26.—N° 2903. (* *)

JACQUET, Claude Hippolyte. — (*Provisional protection only.*)—" An improved calendar clock."

" This invention consists in combining with an ordinary clock " movement an independent spring movement, which second " movement is set in action by a wheel on the first movement " made to perform one revolution in 24 hours through a lever,

" whereupon the second movement causes rollers round which " endless belts are passed, to make a portion of a revolution. " The endless belts have marked on them the days of the week " and the dates of the month in two lines, and the motion of the " rollers is adjusted in such manner that once in 24 hours they " bring the day of the week and the date of the month opposite " apertures made in the clock face; a third aperture is made in " the clock face, behind which on the first of every month the " name of the month is placed."

[Printed, 4*d*. No Drawings.]

### A.D. 1860, December 10.—Nº 3032.

**JOHNSON**, John Henry.—(*A communication from François Guichené.*)—(*Provisional protection only.*)— "Improvements in " apparatus for striking the hours on bells."

"This invention relates to a peculiar arrangement and combination of mechanism, whereby any ordinary clock or timepiece is made to bring into action [at the desired time suitable " striking mechanism for sounding the hours, half-hours, and " quarters, on a set of bells entirely disconnected from the clock " or timepiece which governs them. In carrying out this invention it is proposed to adopt to any ordinary clock or timepiece " suitable mechanism for establishing an electric circuit at the " desired intervals of time, through an electro-magnet, which " magnet, by attracting an armature, releases a train of wheelwork or auxiliary mechanism set in motion by a weight or " spring. This auxiliary mechanism is connected with the ordinary striking movement of a clock, and serves to release the " same by lifting a detent, whereupon the main striking mechanism, which is actuated by a weight or spring, instantly " comes into action and works the striking hammers of the bell " or bells. Thus, in place of the 'going mechanism' of the " clock or timepiece being required to start the striking movement directly, it has merely to establish an electric contact " between two surfaces, when the resulting current sets in motion " the more powerful mechanism which starts the striking movement. It is thus obvious that the largest public clock bells " may be struck by mechanism brought into play originally by a " small clock or timepiece."

[Printed, 4*d*. No Drawings.]

A.D. 1860, December 22.—Nº 3152.

**NEWTON, ALFRED VINCENT.**—(*A communication from A. L. Dennison.*)—" Improvements in watches."

1st. Reducing the size of watches, by "placing the pinion " which engages with the main gear upon a supplementary arbor " out of the centre of the watch, which arbor carries an inter- " mediate wheel that engages directly with the centre wheel ;" the intermediate and central wheels are in the same plane. The barrel is stationary, and the mainspring is connected, at its inner end, to a collar secured to the winding arbor. The main gear forms the cover plate for the barrel and has the power of the mainspring transmitted to it through a ratchet and spring, the ratchet being secured to the arbor and the spring to the gear. The retaining power which drives the train while the watch is being wound up is attached to the " intermediate " wheel, the ratchet of the retaining power being in the same plane as the ratchet of the winding barrel.

2nd. The regulation of watches.—Two pins usually project down from the index hand to lengthen or shorten the vibrations of the hair spring. The present invention " consists in forming " one of the pins excentric, and attaching to its head a small " hand or index, which will show the position of the pin and " the degree to which the spring is confined between the two " pins." After the watch has been regulated by the movement of the index hand, a still further adjustment may be effected by closing more or less the space between the two pins.

3rd. " The scape wheel of lever watches."—By drilling out the spaces between the teeth and afterwards shaping them, " the " spaces between the teeth and the sides of the teeth may be " polished by a spindle in a lathe." This form permits the whole wheel to be made and finished by machinery.

[Printed 10*d*. Drawings.]

## 1861.

A.D. 1861, January 1.—Nº 2.

**COOK, GEORGE.**—(*Provisional protection only.*)—" An improved " watch movement."

This invention "consists in constructing the 'movement' of "watches of two plates, as hereafter described, and in sinking "the wheels contained between the plates in the thickness of the "bottom plate. The top plate is formed with a flange around "almost the entire circumference, and is provided with pins pro- "jecting downwards from the flange, and which enter holes "formed for their reception in the bottom plate."

[Printed, 4*d*. No Drawings.]

### A.D. 1861, January 3.—N° 12.

MOORE, Ponsonby Arthur.—(*Provisional protection only.*)— "Improved feet for leveling clocks and other articles."

"My invention is intended to facilitate the leveling of clocks "and other articles that require to be very accurately adjusted, "for which purpose I insert a screw in the feet on which such "articles usually stand. The heads of the said screws are let "into the bottom of the case or stand at the corners, and the "said feet are free to turn on the said screws, so that by simply "turning the same with the finger and thumb the clock case or "stand can be at once elevated or depressed at each of the corners, "and the clock adjusted to a true level."

[Printed, 4*d*. No Drawings.]

### A.D. 1861, January 29.—N° 237.

CULVERWELL, Robert. — (*Provisional protection only.*)— "Improved apparatus for obtaining motive power or communi- "cating motion to machinery."

This invention "is particularly applicable for actuating the "mechanism of clocks, and one form of apparatus, whereby the "desired object may be effected, consists of a pair of toothed "wheels provided with internal and external teeth. A pair of "pinions mounted on a driving shaft gear into the internal teeth "of these wheels, and drive the same, and by means of the "external teeth of the same wheels communicate motion to "another pair of pinions on a second shaft, on the centre of "which is a toothed wheel which gears into and drives a similar "toothed wheel mounted on the central part of the first or driving "shaft.

"Another arrangement of gearing consists of a pair of toothed "or worm wheels which are made to gear into the threads of a

" vertical screw shaft, which is suspended between them. The " weight of this vertical screw shaft by bearing upon the inclined " teeth of the wheels will cause these wheels to rotate, and thereby " actuate a pair of pinions above, on the ends of the shafts or " spindles of which are a pair of worm wheels which gear into " the threads of the long vertical shaft, and by their rotation " assist in supporting the same, or in lifting it after it has by its " weight caused the two large toothed wheels to rotate."

[Printed, 4*d*. No Drawings.]

### A.D. 1861, January 30.—N° 246.

SMITH, Ephraim.—" An improvement in the manufacture of " swivel rings, especially applicable to swivels and watch keys."

" My invention is intended to refer chiefly to swivels used for " attaching watches and other articles to guards and chains and " to watch keys, and consists in the means of securing the ring " or eye to the body of the swivel or other article to which it is " to be fixed, as hereafter explained. Hitherto the ring has been " secured by a pin or stud being passed through it, and fastened " by a washer, or by an enlarged head or burr being formed on " the head of the pin inside the ring, or by both, the ring being " free to swivel or turn round the pin. Now, I connect the ring " by a tang or tangs formed in a piece with or united to it and " depending therefrom, which I so fashion that on being placed " inside the body, the body may be pressed or closed thereon in " such manner as to allow of the tang or tangs swivelling or " turning in the body without allowing it or them to be withdrawn " therefrom."

[Printed, 6*d*. Drawing.]

### A.D. 1861, January 31.—N° 257.

CLEGG, Robert Dawson.—" Improvements in timekeepers, " called atmospheric clocks or mercurial timekeepers."

The glass tube is made " with a slight contraction a short distance from the orifice." Into the orifice a composition is fixed, and the tube is perforated below the composition " so as to allow " of the air to come out at the exterior surface " of the tube; the ends of the tube are " annealed to an outer glass tube, which " is hermetically sealed." To fill the ends of the tube it is preferred to employ china clay made "in fine sticks covered with

" india-rubber or gutta percha of various thicknesses to corre-" spond with the various bores of the glass tubes." The mercury descends regularly, so as to indicate equal periods of time by a given amount of descent.

The case in which the tube is placed may either contain several dials which can be changed as required, or the dials may be fixed upon a roller that is capable of revolving, or the said dials may be marked upon an endless tape mounted upon rollers, or, lastly, the periods of time may be delineated upon elastic bands, " and " these are so fixed that they can be stretched or slackened in such " a manner that the clock can be regulated and adjusted to keep " correct time." This latter method forms an important feature in the invention, and is preferred to the others.

The drawings show a glass tube, containing the mercury and stoppers, enclosed in two outer glass tubes. An elastic band, capable of adjustment by a peg, acts as a scale, and the compound tube slides through a clip. In another instrument, the said adjustment takes place by means of a screw.

[Printed, 6*d*. Drawing.]

### A.D. 1861, March 1.—No. 525.

**HUGHES, Edward Thomas.**—(*A communication from Monsieur Philippe.*) — (*Provisional protection only.*)— " Improvements in " time-pieces."

" This invention relates to making watches and time-pieces so " as to dispense with the use of keys for winding up, and con-" sists of a fluted button or knob being fixed at the top of a rod " passing through the pendant. The said rod works on a pinion " which gears into the winding-up wheel, and acts as a conductor " to a ratchet and spring. A pin is fixed into the pinion wheel, " which slides on the rod as far as it is pressed down by the " spring, so that by drawing up the fluted knob, the rod draws " up as well as the pinion. The ratchet being caught by its " notch into the sides of the pinion, changes position, pushes " the spring towards the centre of the pallet plate, and keeps it " at the end of the extreme angle. The pinion also being " pushed by the spring towards the same centre, engages itself " into the hand wheels, and by turning round the knob the hands " turn, and, on the contrary, if the rod is pressed on the knob, " the pinion pushes down the ratchet, the extreme angle of which

" withdraws from the spring which falls into a notch where it is " kept near the circumference, keeping the bevilled pinion from " the centre and disengaging it; then if the fluted knob is " turned round, the rod acts through the pinion upon the " winding up wheel. Or the same results may be obtained by " a small piston being placed on the side of the square and " pressing upon the ratchet, or by a small bolt similar to that " used in a seconds' watch, or various other modifications of the " principle above described."

[Printed, 4*d*. No Drawings.]

### A.D. 1861, March 5.—N° 557.

**HASELER, William Hair.**—" Improvements in joints or " hinges for jewellery and other articles having or admitting of " metal joints or hinges;" also " improvements in the manner " or means of suspending such articles by or with such joints or " hinges."

This invention " consists, in the first place, in making such " joints or hinges of two or more rings or pieces of metal of any " suitable shape, and attached, secured, or connected together by " means of a tube or hollow rivet, constructed somewhat in the " manner of a common eyelet hole. The connection thus formed " is arranged in such a manner that the several parts may move " or revolve one upon the other. The rings or pieces of which " the hinge or joint is composed are soldered or otherwise attached " to the separate parts of lockets, brooches, boxes, watch cases, " or any other articles, and with the tubular or hollow rivet will " form the joints or hinges, and the means of suspending such " articles by or with such joints or hinges."

The drawings show many applications and modifications of this invention. In a watch key, the loop is passed through the tubular rivet. In a watch, provided with a joint and pendant, the watch forms the central piece, attached to the tubular rivet, and the glass frame and back work upon the said tubular rivet, as upon a centre. In another modification, the hinge pieces are attached to the halves of the case in the same plane, instead of at right angles thereto. In a watch hook that works upon a tubular rivet as a centre, the split parts fit upon each other when closed.

[Printed, 10*d*. Drawing.]

### A.D. 1861, March 30.—N° 789.

**GUIBLET, Jules Jean Louis, and RAMBAL, Joseph.**—" Improvements in keyless and other watches and time-keepers."

1st. Winding keyless watches.—Heretofore, in watches constructed on " the going barrel " principle, they have, in some cases, been wound and their hands have been set " by turning the " pendant or an axis passing through the same." A ratchet wheel is mounted on the winding axis, and the watch is wound by means of a click that takes into the said ratchet wheel; when however a stud at the side of the watch is pressed, a toothed wheel, mounted on a frame, gears with the minute-hand wheel, and sets the hands. In this arrangement, when the watch is fully wound, the hands can only be moved in one direction. The present invention obviates this inconvenience by arranging the mechanism " so that when the stud is pressed on, for the purpose " of setting the hands, the pawl or click, which in winding drives " the ratchet wheel on the winding square, is lifted out of the " teeth of the said ratchet wheel."

In chain and fusee watches, a toothed wheel, immediately over another on the winding axis, is only brought into gear with the winding axis (by means of an intermediate wheel on a rocking shaft) when the pendant is turned in a direction to wind the watch.

2nd. The escapement of watches and other timekeepers.—In " the plain lever escapement," according to this invention, the impulses are given "more directly in the line of the axes of the " disc and the lever," than heretofore, so as to lessen the friction. " For this purpose a hole is formed in the centre of the pin, and " a small stud or projection on the lever enters this as the lever " passes, and the required impulses are given by the said stud or " projection."

[Printed, 8*d*. Drawing.]

### A.D. 1861, April 4.—N° 828. (* *)

**LEE, John Walker.**—(*Provisional protection only.*)—" Improvements in apparatus used in winding up watches, clocks, " time pieces, musical boxes or tell-tales, or for other purposes to " which the same may be applicable."

"I employ a steel or other metal pipe, similar to the pipe of "a key as usually made for winding up watches, clocks, or other "instruments of similar character to those above named, and "instead of rings and a swivel being secured to the top of such "pipe, I firmly attach one half of a circular disc to the top of "the pipe (the lower end of which fits on to the square of the "watch, clock, or other article). To the half disc I connect "a similar half disc by hinging the two together, the disc formed "of the two halves being made as thin as is convenient. To the "under or pipe side of the fast half I attach a spring, which "will force the second half disc into a position at right angles to "the first half disc, when the second half is set free by moving "a small stud at the end of a spring or catch a little on one side, "such spring or catch being secured to the upper side of the "fast half. When the two half discs are in such a position as to "form one disc, the top of such disc will lie flush with the inner "case of the watch, clock, or other article to which it belongs, "such case or plate having the hole through which the key is put "on the square made as large as the disc, so that the disc may "freely revolve in the same; or I attach the fast half of the disc "to the square of the winding axle, instead of to a key pipe, and "instead of using a spring or spring catch to release the second "half disc, and force it up into a position for taking hold of to "wind up the watch, clock, or other article, I attach a spring "(which forms part of a circle) to the under side of the two half "discs, and make the end of such a form that when the stud is "moved a little sidewise (the stud moving in a slot in the fast "half disc) the end of the spring is moved from under the fast "half disc and forces up the second half, as above described, "retaining it in a position for winding until it is forced down "again, and the stud moved into its original position."

[Printed, 4*d*. No Drawings.]

### A.D. 1861, April 9.—N° 869.

GILL, Charles.—(*Provisional protection only.*)—"Improvements in the construction of swivels, hooks, or other similar "connecting instruments for chains, jewellery, and other articles."

By means of this invention watch chains are rendered "more "secure and durable, and less liable to become unfastened, either "by accident or design." The invention "consists, first, in the

" application of a locking instrument or bolt for closing the " passage into the eye or loop of a swivel or hook,", to which a watch is connected; " and, secondly, in an improved method of " attaching the swivel ring to the stems of such swivels, or to " watch-keys."

The hook or loop portion of a swivel for connecting watches to chains is formed as heretofore; the passage to the interior of the loop is closed up by means of a jointed piece, which is connected at one end by a pin joint to the stem of the swivel, the other end being formed with a projection to act as a bolt, which, when closed, passes through a hole in the point of the hook " and across the " loop, the end of such arm entering into a recess in the opposite " side, where it is retained by a spring or split in the arm, and by " recesses which act as catches " to hold the closing piece until it is withdrawn by force. The action of a helical spring may cause the cross arm and cross bar to move inwards. Instead of attaching the swivel ring to a watch key by rivetting the top of the stem over a loose collar, the ring is formed with a cap, and the top of the stem has a fixed collar thereon, " below which a loose " collar is placed on the stem of the same diameter as the fixed " head or collar, and of the inner diameter of the cap on the " ring, which is then placed over the stem, and the loose collar is " then fixed or secured to the cap or socket of the ring by pins " passed through the sides of the cap into the loose collar, or " by soldering, or by other convenient means."

[Printed, 4*d*. No Drawings.]

### A.D. 1861, April 19.—N° 961. (* *)

**EAVES, Arthur Frederick.**—(*Provisional protection only.*)—This invention relates to the manufacture of bezels or rings, used amongst other things for containing or enriching the glass coverings which enclose the dial faces of clocks, barometers, steam gauges, and such like articles. A strip of metal is first formed into a loop or ring by bending, until its two ends meet, which are then soldered or brazed together. It is then placed in a lathe chuck, which is slightly conical, and by pressure with an ordinary pressing tool while the lathe revolves the hoop is made conical; it is then placed in another chuck, which by means of pressure with a suitable tool as before forms a rim round the outer edge; another chuck in conjunction with another pressing tool operates the inner part of the hoop, in which an annular groove is afterwards turned to receive the glass, which is sprung into it. The hinge and peg are attached to the bezel afterwards in the ordinary manner.

[Printed, 4*d*. No Drawings.]

### A.D. 1861, April 22.—N° 998.

**DOWLING, John Thomas.**—(*Provisional protection only.*)—
" An improved instrument applicable to timekeepers for pre-
" senting to view numerals to indicate time."

"This invention consists of a case in which are arranged or disposed a series of short rollers placed loosely on an axis placed parallel to the face of a timekeeper; said rollers have a series of numerals on their peripheries denoting hours, minutes, and seconds, an opening being formed in the case to expose to view one horizontal row or line of numerals; the aforesaid rollers have teeth formed on their edges corresponding with the numerals thereon. The said rollers are propelled by the intermittent action of clicks arranged one to each roller, and operating in such a manner as that when the series of numerals on the first or 'seconds' roller has completed one entire revolution, a notch or recess on its opposite edge allows the click of the next and adjoining roller to fall down and thus to act on one tooth of the second or 'minutes' roller, and so on throughout the series of rollers, or the rollers may be placed on separate axes, or at any angle to the face of the timekeeper, and the minutes marked on the sides of the rollers or discs of metal or glass, or plates of metal moved similarly to either of the ways before mentioned may be employed, or the seconds may be represented by numerals fixed in any suitable way to the 'scape wheel of the timekeeper. The minutes and hours to be represented as before described. In all cases it is the outer face of the timekeeper that conceals all the numerals except those which are required to show the time, namely, the hour and parts of an hour at one view and in one line."

[Printed, 4*d*. No Drawings.]

### A.D. 1861, April 26.—N° 1047.

**HILL, Charles John.**—" Improvements in the dials of watches
" and clocks."

"This invention consists in forming the dials of watches and "clocks and other indicators of time of a material not hitherto "adopted for such purposes." The inventor employs "(in lieu of "enamel, silver, or gold, or other materials coated with either of "these metals) dials formed of shell, called pearl or mother-o'-"pearl, either plain surfaced, engine turned, or engraved, or "otherwise ornamented, or where the size of the dial will not "admit of its being made in one piece, then several pieces may "be joined together in stars or other devices, so as to obtain a "smooth surface, which may be afterwards treated in the manner "before described. The cases or backs of watches may likewise "be manufactured of this material and highly ornamented."

[Printed, 4*d*. No Drawings.]

### A.D. 1861, May 2.—N° 1103.

BROOMAN, RICHARD ARCHIBALD.—(*A communication from Paul Fléchet.*)—"Improvements in solar timekeepers or chrono-"meters."

The solar chronometer is composed of the four following principal parts:—1. A stand with levelling screws and a vertical pivot. 2. A socket piece capable of revolving on a horizontal axis, the bearing of which can rotate on the vertical pivot. 3. A cap, the upper part of which is formed as the segment of a sphere; its circumference is divided into 24 equal parts indicating hours, and its vertical axis is mounted in the socket piece. 4. A standard carrying a lens; another standard opposite to the said standard carries a section of a sphere of which the lens is the centre; both these adjuncts are screwed on to the cap. Besides these parts, clamp screws fix them in position, and a vernier is attached to the cap. On the section of the sphere "the equi-"noxial line" is marked and a curve is traced "showing the "equation of time for each day of the year." A line is stretched from the top part of the section of the sphere, from which a plumb line may be temporarily suspended to adjust the instrument in the vertical plane.

The pivot of the cap, and the central line of the section of the sphere are placed in the vertical plane, and the zero of the vernier is brought to noon. To give the socket piece "the desired "inclination at mid-day," the focus of the lens is brought "on "the point of the curve corresponding to the day" without displacing the horizontal axis of the socket piece — " the " apparatus will be in position and the vernier will give the " hour."

[Printed 1*s*. Drawings.]

### A.D. 1861, May 17.—N° 1257.

**DUNN, Thomas.**—" Improvements in watches and pocket " timekeepers."

This invention " consists in making watches or pocket time- " keepers with glass covers over the inner works to keep out the " dirt and atmosphere, and in lightening out the inner framework " or plates, so that the watch when held up to the light is trans- " parent, and the whole, or nearly the whole, of the machinery " may be seen at work, in order to be able to detect small par- " ticles of dirt or grit before they cause any injury." In hunting or travelling watches, an outer metallic frame or case is attached thereto " by a spring or other fastening, so that it may be " detached for indoor use."

Another part of this invention " consists in attaching to watches " and pocket timekeepers a double shank, working on a swivel, so " that a neck guard and a short guard may be used together, and " each side of the watch turned to view without inconvenience. " This swivel also prevents the shank from being twisted off, as is " the case in watches of the ordinary construction."

[Printed, 6*d*. Drawing.]

### A.D. 1861, June 22.—N° 1612.

**COLE, John, and COLE, Joseph.**—(*Provisional protection not allowed.*)—" An improvement in the construction of watches."

" The object of this invention is to obtain by a simple arrange- " ment of driving gear an independent dead centre seconds' " movement." In an ordinary watch, an extra pinion of twenty teeth is mounted " on an arbor that projects through the pillar " plate. This pinion gears into the fourth wheel, and receives " motion therefrom for the purpose of driving the arbor, which " carries loosely at its upper end a second pinion of twenty teeth. " This second pinion is made hollow to receive a collet and " spring, by which the pinion is secured to the arbor in such a " manner, that whereas the rotation of the arbor is continuous, " that of the pinion may be intermittent. To obtain this inter-

" mittent motion, there is attached to the hollow pinion a cylinder
" wheel of ten teeth, and to the pallet pinion pivot (which comes
" through the pillar plate) a cylinder or relieving plate, which
" acts on the cylinder wheel. The continuous rotation of this
" relieving pallet will cause the alternate retention and release
" of the cylinder wheel, and thus enable it to rotate only by
" pulsations. These pulsations are communicated to a centre
" seconds' hand, carried by a centre seconds' wheel of sixty teeth
" in gear with the hollow pinion. To stop the action of this
" gearing," a long pin is provided "which may be thrown into
" contact with the hollow pinion, and will then stop its rotation,
" the spring contained within it slipping round without it."

[Printed, 4*d*. No Drawings.]

A.D. 1861, July 12.—N° 1759. (* *)

**BERCHTOLD**, Samuel.—(*Provisional protection only*.)—" Im-
" provements in perpetual calendars, to be used either separately
" or in connection with watches or clocks."

"The principal feature of my invention consists in the manner
" in which the day-of-the-month wheel is connected with the
" month wheel, so that reciprocally one acts upon the other, thus
" producing the necessary number of days for each month."

The mechanism is set in motion by means of a click lever, one end of which takes into the teeth of the ratchet wheel which is also the day-of-the-month wheel; this wheel is moved one tooth (by a spring reaction) every time the click lever is drawn out of contact with the teeth of the wheel, which is done once each day. By means of a pinion, disc, and three-armed click, the arbor of the day-of-the-month wheel, thence the hand of the calendar, is taken from the first to the last day of the month; also, on the last day of the month, the said arbor and hand are carried back to the first day of the month; the wheel segment (moved by a spring) which does this, has a hook which actuates the month wheel when the indicating hand is returned to the beginning of the month. By means of a spring lever and a notched lever, the necessary number of days of the month are allowed for. For indicating the 29th of February in bissextile years, a star wheel acts on a stud on the month wheel, and is connected on the other hand with a cam which actuates the before-mentioned notched lever once in four years.

[Printed, 4*d*. No Drawings.]

### A.D. 1861, July 20.—Nº 1833.

**COLE, JOHN, and COLE, JOSEPH.**—" An improvement in the " construction of watches."

This invention relates to a method of obtaining the dead-beat action in centre seconds watches.

In adapting this invention to an ordinary watch, a pivot, projecting through the pillar plate, carries an extra pinion which receives motion from the fourth wheel; it also carries loosely a diminutive going barrel, within which is contained a small collet and a coiled spring. The barrel, being connected to the free end of the spring, slips round with a sudden impulse when released from the locking apparatus, " thereby setting the dead centre " seconds' hand in motion." A toothed ring, on the periphery of the said barrel, gears into the centre seconds wheel; the barrel also carries a toothed wheel which gears into a pinion supported between the pillar plate and a small cock attached to the back thereof. The arbor of the pinion carries a fly wheel which acts as an escape wheel, being provided with three teeth for this purpose. The teeth are successively retained and released by the action of a pallet pinion, at such intervals as to permit of the barrel moving on its arbor once for every second of time. " At every escape of " the fly from the pallet pinion the seconds' wheel will be driven " round the distance of one tooth."

To throw the seconds movement out of action, a spring catch, worked by a rocking arm, has its fulcrum on the pillar plate. When the arm is rocked in one direction by the wearer, the spring catch stops the further movement of the fly wheel; by moving the arm in the opposite direction, the fly wheel is released and the motion of the seconds wheel recommenced.

[Printed, 8*d*. Drawing.]

### A.D. 1861, August 5.—Nº 1941.

**JOHNSON, EDWARD DANIEL.**—" An improvement in the con- " struction of centre seconds watches."

The constant seconds and the independent seconds are driven by the same train of wheels and prime mover.

" The barrel, fusee, and first wheel, centre or second wheel, and " the third wheel remain as heretofore in the centre seconds " watch," but the fourth wheel is duplicated. The primary fourth wheel is placed in the centre of the frame and its duplicate is mounted on a simple axle, in the same plane as the primary, midway between the centre and circumference of the frame, and at a point exactly opposite the pendant of the watch ; these two wheels are connected "by a smaller intermediate spur wheel, " mounted on simple pivots, whereby motion is communicated to " the secondary fourth wheel, which in its turn drives the escape- " ment of any suitable form. This arrangement admits of any " seconds mechanism being attached to the primary fourth wheel " axle, where it projects through the plate for throwing the centre " seconds hand in and out of action." The centre seconds hand may be coupled by friction of contact with the moving mechanism, the contact being maintained by pressure upon a spring stop in the centre of the pendant.

The drawing shows the improvements as applied to a centre seconds watch fitted with the means of transmitting motion from the seconds wheel arbor to the seconds hand, forming the subject of Specification No. 2702 (A.D. 1855).

[Printed, 6*d*. Drawing.]

## A.D. 1861, August 6.—N° 1946.

PETIT, **Jean Auguste**.—(*Provisional protection only.*)—" Im- " provements in the manufacture of watches and clocks."

1st. The escapement.—The escape wheel can be approached to, or receded from, the anchor by means of a slide ; it is so formed that the pallets " slide down on an inclined plane of the said " wheel," and, in case of a strong jerk, a recoil can be effected.

2nd. The repeater.—The barrel, its spring mover, and the wheel-work of ordinary repeaters are dispensed with. The hammer strikes once for the hours, twice for the five-minute fractions, and again once for the minutes.

3rd. The minute hand.—A screw fixes the hand on the minute wheel, and the minute wheel on its own rod.

4th. The spiral.—Its end is fixed " by means of a steel spring " pincher tightened by means of a screw."

The above-mentioned improvements are applicable to watches. The herein-after described improvements are more particularly applicable to clocks and alarums.

5th. The spring barrel.—This is increased in size, and it may be removed without taking the clock to pieces. The barrel wheel is of ordinary size, and is fixed to the barrel by means of two screws, one of which also fixes the "stop wheel" between the barrel and the said wheel.

6th. The alarum.—The barrel and spring of the alarum "are " replaced by a toothed circle," " acting as a single piece, with a " click mounted on the axle of the spring barrel."

7th. The pillars.—These " serve also to fix the dial plate. To " this effect the screws which fix the pillars on the lower plate " form the pillars of the dial plate, and the whole is fixed by " screws or nuts."

[Printed, 4*d*. No Drawings.]

## A.D. 1861, August 6.—N° 1959.

SILVESTON, FRANCIS.—" Certain improvements in watches."

In this invention, the works are so arranged "as to allow the " balance to work below the surface of the top plate."

"An escapement bar" is fixed "underneath the top plate " beneath the circular hole in which the balance wheel works." Between the said bar and the pillar plate, "the escapement and " fourth wheel work." The barrel works partially through a hole in the top plate, so that the top of the barrel is " flush with " its upper surface;" over this, "a name bar or plate" is secured, " through which the axis of the barrel works," and upon which " a click or pall and ratchet may be placed for regulating or " preventing the running back of the spring." The cock that supports the axis of the balance wheel is placed "upon the upper " surface of the top plate and against the edge of the name " plate;" in its upper surface it is flush and parallel from end to end with the name plate, and may be used for carrying the regulator.

In this improved arrangement, the works can be placed either " right or left-handed," and "the barrel may be placed on the " left or right-hand side of the balance, the fusee being placed, as " a matter of course, in an opposite direction." In the act of winding, the fusee is turned "towards the box containing the " spring." " One edge of the chain winds on the barrel of the " spring, and the other edge on the fusee." To prevent overwinding, an outside stop is applied " upon the face or pillar plate " between its outer surface and the dial."

[Printed, 8*d*. Drawing.]

A.D. 1861, August 13.—N° 2009.

**JACOB, JOSEPH.**—(*A communication from Franz Kosch.*)—" Im-" provements in producing on porcelain and other ceramic pro-" ducts, on glass, Venetian enamels, and on metallic surfaces, " designs in colors, and in gold, silver, and other metals."

" Glass, dials, enamels, and Venetian enamels, as well as " object " [objects?] " made of or with a surface of gold, silver, " copper, brass, or other suitable metal " are decorated by means of this invention.

The chromo-lithographic designs are printed on paper and transferred upon the article. "The prepared metals and pre-" pared colors, as well as the vitreous mass or flux are in all cases " reduced to the finest powder or dust before being used." For producing decorations upon the glaze, the enamel flux "is ground " into a paste with varnish spread upon the roller, and transferred " upon the stone, from which it is printed on to the paper in the " lithographic press." The various impressions so produced are then, by means of a soft brush, coated with the corresponding colour or metal which is to form part of the intended ornamentation. In most cases, however, the colours are ground separately into a paste with varnish and with the suitable enamel flux, and are so applied. For decorating under the glaze, the colours are ground into a paste with varnish, and the printed designs thence arising (a stone to each colour) are transferred to the glazed ware by the assistance of an adhesive resinous substance. Thus the entire design is in one operation fixed upon the ware. The paper is detached by means of water and the design is burnt in in the usual manner.

[Printed, 4*d*. No Drawings.]

A.D. 1861, August 15.—N° 2040. (* *)

**FAUCHERRE, JULIAN.**—(*Provisional protection only.*)—The title of this invention is " An improved mode of manufacturing " gold dials."

The inventor states:—" I first produce an engraved plate of " the dial intended to be reproduced, and from this, by means of " the electrotype process, I prepare a matrix of copper. In this " matrix I deposit any desired thickness of gold by the electro-" type process, and the gold copy so obtained I mount upon a " backing plate of brass fitted at its back with pins suitable for

" fixing the dial to the watch or clock frame. The gold electro-
" type copy I secure to the backing plate by means of solder, and
" in order to facilitate the process of soldering the dial to the brass
" backing plate, I first submit the gold dial face to ebullition in
" water, taking care to change the water frequently; and in order
" to remove any cyanide of potassium which may still remain
" in excess, and thoroughly to clear out the pores of the gold, I
" immerse the dial in fluoric acid and afterwards wash it in boiling
" water. It is then ready to receive at its back a deposit of
" copper which will facilitate the soldering of the brass plate
" thereto. When the soldering has been effected I cover the
" backing plate with a protecting coat of wax, and then immerse
" the whole in a bath of dilute nitric acid by the action of which
" the copper matrix will be removed from the face of the gold
" dial plate. The dial may now be cleaned, cut, and finished in
" the ordinary manner."

[Printed, 4*d*. No Drawings.]

### A.D. 1861, August 24.—N° 2118.

COATHUPE, Henry Bentinck.—" Improvements in time-
" keepers."

This invention relates to a method of indicating time by the descent of mercury in a glass tube that is plugged with a porous substance at each end and hermetically sealed within an outer tube. The compound tube is adjustable within the spring clips of an index frame. The instrument is hung up so that the tube is vertical, and when the mercury nearly reaches the lower end of the tube it is reversed.

A glass index is used for "the night lamp clock;" this clock may be arranged so that the mercury, by its opacity, may clearly indicate the hour on the transparent index. The clips or holders
" may be made of hard or soft wire, iron, steel, or brass, or they
" may be cut out of tin plate or other suitable material; these
" may be single or double; the single clip is fastened by a nail or
" screw, while the double clips hold firmly both the tube and
" clock index, board, or frame." "The dials or indices may be
" made of various materials, such as wood and enamelled paper,
" sheet iron or tin, stamped, painted, enamelled, or printed, and
" they may be colored and ornamented as desired."

When the clock is hung up "the mercury begins to fall in the
" tube by its own weight; but its rate of descent must depend

" on and be governed by the rate at which it can push the air " beneath it through the lower plug, and suck it back again " through the upper plug as well. This double-governing action " constitutes one great merit of the clock."

[Printed, 8*d*. Drawing.]

### A.D. 1861, September 6.—N° 2228.

**HUGHES, Edward Joseph.**—(*A communication from Adrien Jean Philippe.*)—" Improvements in watches."

" Winding up the watch and turning round the hands at " pleasure without the use of a key."

In one arrangement, a rod passes through the spherical knob of the pendant; this rod " turns round and slides at pleasure," and carries a straight or bevilled pinion (or remontoir pinion) which gears into the fusee or remontoir wheel and " acts as a conductor " of a ratchet. A crown pinion also rotates with the rod (being mounted near the end of the rod) but is capable of sliding on it. A fixed spring has the position of its extremity regulated by the before-mentioned ratchet and acts upon the crown pinion accordingly. The crown pinion, being capable of gearing with the hands wheel, turns the hands when the fluted knob is drawn up. When the fluted knob is pressed down, the crown pinion is kept away from the centre and the straight or bevilled pinion is free to act upon the remontoir wheel. " Conical gearings " can be used instead of " straight gearings."

The drawings show another plan, similar to the above, but in which the pressure of the fluted knob acts upon the ratchet wheel of a Bréquet's key arrangement to disengage the remontoir pinion.

In a third modification, the Bréquet's ratchet is combined with an external piston, which engages the crown wheel by means of a ratchet or lever " piece."

In other modifications, a sliding bolt is substituted for a piston bolt; the remontoir pinion and crown wheel are in one piece; the said pinion and wheel are made separately; and a small intermediate lever may be used to receive and transmit the pressure upon the fluted knob to the great arm. In general the pieces are brought into their normal position by pressure upon the fluted knob.

[Printed, 8*d*. Drawing.]

### A.D. 1861, October 11.—N° 2544.

**STRAM, Numa.**—" Improvements in watches."

This invention consists in the combination of the " remontoir " and " reversible " watches.

" For this purpose the interior case, which contains the watch " movement, is fixed on a pivot adapted to a joint fixed on the " middle part or ' collier,' of the exterior case (as has before been " proposed) so that by reversing the interior case on this pivot, a " hunting watch or an open faced watch is obtained. The " winder consists of a head fixed on the end of an axis connected " with the works of the watch; this head is exactly opposite to " the pivot uniting the two cases so that the head always comes " to the same point of the middle piece of the exterior case. At " this point an opening is made to admit the head; this opening " is made in such manner that when the exterior case is close the " watch has the appearance of an ordinary open faced watch, or " an ordinary hunting watch."

[Printed, 6*d*. Drawing.]

### A.D. 1861, October 15.—N° 2564.

**FLINN, John, the elder.**—" An improvement in watches."

This invention " consists in using a spring and barrel of the " kind commonly called a going barrel in connection with an " improved wind-up, constructed as herein-after described." In constructing the said wind-up, a toothed wheel is placed on the axis of the barrel, and a similar toothed wheel is placed on another parallel axis, " the said toothed wheels taking into one another. " The last-named axis is the one to which the key is applied in " winding up the watch, and by means of the said axis and the " toothed wheels described, the watch is made to wind up in the " same way as ordinary English watches, and contrary to that in " which watches with going barrels ordinarily wind."

[Printed, 6*d*. Drawing.]

### A.D. 1861, October 26.—N° 2688.

**PARKES, Samuel Hickling.**—(*Provisional protection only.*)— " Improvements in watch keys."

This invention " consists, firstly, in making a neck or collar at " that part of the watch key where the pipe is fitted to the body

" of the key, and fitting to the said neck or collar a moveable " cap or cover. The said cap or cover protects the square hole in " the barrel of the watch key from dust and dirt when the key is " not in use, and thereby prevents that injury to the watch which " might arise from dirt in the said barrel. As the said cap or " cover is made by preference of a tubular figure it may form " part of or be fixed on the top of a pencil case. The body of " the key may be made of the same ornamental form as the " body of the pencil case, so that when the barrel of the watch " key is inserted in the cap or cover in the end of the pencil case, " the body of the said watch key closes the end and forms the " termination of the pencil case. Or the cap or cover which " protects the watch key may be inserted in the end of a pen- " holder or toothpick."

This invention "consists further in combining a watch key " with a pencil case or penholder or toothpick, the said watch " key being fixed on the top of the pencil case, penholder, or " toothpick. The pipe of the watch key may be protected by a " moveable case of the kind herein-before first described. By " fixing a watch key at the top of a pencil case or penholder or " toothpick it is held more readily, and is in less danger of being " lost."

[Printed, 4d. No Drawings.]

### A.D. 1861, December 10.—Nº 3093.

**REDIER, Joseph Antoine Jean.**—"Some improvements in " pocket watches."

These "improvements consist in a new construction of the " watch case, and in the mechanical arrangement for winding up " the watch, and setting the hands to the hour by means of a " projecting stud or knob placed above or in the ring or handle " of the watch."

The watch case consists of a bottom and a ring or frame for the glass. The pendant knob and the ring are fixed to the works by a screw, and thus the watch case can be attached. "If desired, " a hinge may be employed for opening the bottom and the ring " or glass frame placed in front of the pendant, and one of the " knuckles of the hinge is fixed or moveable according as the " ring or frame or the bottom is to be opened."

To wind up the watch, a double-toothed wheel, rotated by a pinion on the pendant axis, gears with a wheel on the "winding-up "square." This latter wheel moves by friction (the friction wheel) and is kept in its position by a ratchet wheel fixed to the barrel.

By depressing a stud, a small wheel, always in gear with the friction wheel, approaches a small wheel on the centre axis. The pendant being rotated in the proper direction, the friction wheel slips over the ratchet teeth but turns the hands of the watch. This may also be accomplished by means of a lever that carries a pinion on one of its extremities; the lever may be moved "to the "right or left without turning its calibre."

The knob may be used "as a presser in hunting watches without "the gearing wheels of the winder being altered."

The "presser" may be "adjusted by a single notch made in "the case in any desired position."

[Printed, 8*d*. Drawing.]

### A.D. 1861, December 17.—N° 3160.

CHALFONT, JOHN WILLIAM, and KEYS, DAVID.—(*Provisional protection only.*)—"Improvements in the method of and "apparatus for winding up fusee watches and pocket chrono-"meters, and setting the hands without key."

"This invention relates to an improvement in the mode of "winding and setting hands without the aid of a key to fusee "watches and pocket chronometers at the pendant." The plan is as follows:—"On the axis of the fusee either top or bottom is "fixed a wheel, into which acts another attached to a ratchet; "over the ratchet runs a wheel in gear with a contrate wheel, the "arbour of which goes through the pendant, that may be turned "by a small knob, which is also in action with a click spring, "this spring is fastened in a box that is detained by another "spring, so that when the wheel in action with the click is turned, "it brings the click in action with the ratchet, and thereby the "watch is wound up. When the detaining spring is pushed "away by a piece projecting from the side of the case, it leaves "the click free of the ratchet, at the same time taking an inter-"mediate wheel into gear with the minute wheel, thereby enabling "the hands to be set either way."

[Printed, 4*d*. No Drawings.]

## 1862.

A.D. 1862, January 8.—Nº 57.

**BRADSHAW**, William, the younger.—"Improvements in "watches."

This invention "relates to a novel arrangement of the works for "actuating a centre second's wheel and hand." "The centre "second's hand is mounted upon a pivot, and is carried over the "other hands without the necessity of using the extra wheel which "is usually employed for this purpose in watches provided with a "central second's hand. The power for actuating the centre "second's hand is gained from the third wheel, and is carried "out by two extra wheels and three pinions; one of the wheels "is on the centre second's shaft and the other is an intermediate "wheel which actuates the fly pinion. The second's power is "directly connected with the independent second's hand, being "attached to the same arbor or shaft that carries the second's "hand. For this purpose there is an extra power or spring "enclosed in a box or collet on the second's hand shaft, and on "this same shaft is a pinion which gears into and is driven by "the third wheel."

To stop the independent second's hand without stopping the other parts of the watch, an arm or lever is provided. This lever rocks on a screw, and one end of it projects through to the outside of the case of the watch, while the other end carries a small pin which works through a slot cut in the pillar plate, and when the arm or lever is rocked upon its centre the pin comes in contact with the fly and stops its further motion.

[Printed, 8*d*. Drawing.]

A.D. 1862, January 11.—Nº 86.

**WILKINSON**, William.—(*Provisional protection only.*)—"Improvements in ornamenting and decorating metals, glass, "porcelain, parchment, and other skins, and in the materials and "ingredients employed therefor, also in protecting silver and "gold on said materials, and on surfaces or plates of glass or "metal, or plates of glass and metal combined, applicable to "works of art, furniture, jewellery, and other articles of a useful "and ornamental character."

"In adapting these improvements to textile or woven fabric " or lace, I proceed as follows:—I stretch the fabric upon a sheet " of glass, and connect it thereto near the edges by a margin of " opaque paint and cement; I then take another sheet of glass of " corresponding size to the former sheet, and cement the two " sheets together;" "the fabric being between the two sheets of " glass thus ornamented, is well adapted for windows, as a substitute for muslin curtains, which now require to be washed." " Perforated paper, parchment, and other skins may be employed " in the same manner and for a similar purpose. To adapt textile " or woven fabrics, paper, parchment, lace, or other materials, " gold, silver, or other metals or alloys suitable for clock and " watch dials, and other purposes, the fabrics may be adapted " thereto, as lastly above described." The cement above mentioned is composed of "gum arabic, white wax, coloring matters, and " linseed or olive oil, the proportions varying according to circumstances."

[Printed, 4*d*. No Drawings.]

### A.D. 1862, January 21.—N° 161. (* *)

**HENRY, MICHAEL.**—(*A communication from François Victor Guyard.*)—" Improvements in the mode of and apparatus for " applying electricity to horology."

The electric current is only used periodically to correct the clocks, which are kept going in the ordinary manner, and the electric current need not act simultaneously on all the clocks under control, but only upon so many as can be acted upon conveniently by a single current.

The clocks to which this invention is applied are regulated so as always to gain slightly, and, when the time arrives at which they are to be electrically regulated, they are "stopped for a very short " interval to await the transmission of the regulating current, " which allows of their setting off again at the exact moment."

An electro-magnet, excited by the regulating current, removes a stop-lever when the time for the starting of the clock again has arrived, the said stop-lever acting upon the minute hand or other axis just before the transmission of the current; when the regulating current has circulated, the stop resumes its normal position ready to act upon the axis just before the next transmission of the regulating current. Each batch of clocks is regulated at a different part of the hour or other periodical time.

Each of the clocks regulated may be made secondary regulating clocks, if they have suitable extra contact points besides those for the main regulating current, the said extra contact points being " connected with a second conductor, through which a current " wholly distinct from the principal or main current is continuously " sent."

[Printed, 4*d*. No Drawings.]

## A.D. 1862, January 30.—No 248.

**ROBOTTOM, HENRY, and UNDERWOOD, RICHARD.**—(*Provisional protection only.*)—" Improvements in watches and " pocket chronometers."

" The object of the improvements is to arrange parts of watches " and pocket chronometers so that they may be 'wound up' and " the hands 'set' without requiring a key or other separate " instrument for the purpose."

Through the pendant a spindle is passed, " upon the outer end " of which is affixed a milled head or other means to facilitate " its being turned; at the other end is affixed a bevilled pinion " which takes into to drive another bevilled pinion, the axis of " which is carried by one end of a spring which also carries a " bearing for the first pinion. When motion is given to the " spindle by its head the bevilled pinion thereon gives motion to " that into which it gears. This second pinion takes into the " teeth of another wheel, and by friction at contact therewith is, " in its rotation, drawn into contact also with the teeth of a " wheel driving the fusee. This latter wheel is held by spring " adjustment to its arbor so as to yield in the event of the teeth " thereof being met end to end.

" Movement of the hands is obtained by bringing one of a " series of wheels into contact (by pressure or otherwise) with the " driving means referred to, such wheelwork being drawn out of " gear when the required setting of the hands has been effected " by spring. For giving motion to movements without fusees, " the spring bearing the second bevilled pinion will not be " required."

[Printed, 4*d*. No Drawings.]

### A.D. 1862, February 15.—N° 404. (* *)

**JOHNSON, John Henry.** — (*A communication from John Henry Koosen.*)—(*Provisional protection only.*)—" Improvements " in electro-magnetic timekeepers."

1st. A " galvanic chronometer."—The wheelwork of this chronometer is actuated by a rotary electro-magnetic engine, in which " the accelerating force acts nearly uniformly in all phases of its " rotation," and, " no intervals of suspension of the acting power " can interfere in any part of the revolution." The electromagnetic engine consists of three vertical electro-magnets, " so " disposed that their six poles will form points equidistant from " each other in a horizontal circle," together with a vertical driving axis, which carries two soft-iron bars or armatures at right angles to one another. By means of a wheel commutator, on the said vertical axis, the galvanic current is admitted to the coils of the electro-magnets in succession, and the poles of the said electro-magnets being alternate in the circle, the soft-iron bars are acted upon, and the driving axis is rotated thereby.

2nd. A " centrifugal regulator."—A steel rod is pivoted at its centre of gravity upon an axis, the bearings of which are " in a " metal ring secured to and encircling the vertical main axis " centrically." " To the lower end of the steel rod is attached a " brass wire," which ordinarily connects one battery pole to the commutator spring or rod; " to the upper end of the steel rod is " connected, by means of a fine platinum wire, one end of a thin " steel blade spring, the other end of which is secured into the " supporting ring of the regulator." When the driving axis revolves, the steel rod tends to assume a horizontal position, and thus to break the electric circuit; the reaction of the blade spring, and the adjustment of weights on the steel rod, keep the circuit unbroken until a given velocity is attained, and thence establish a uniform rate independent of the strength of the battery current.

[Printed, 4*d.* No Drawings.]

### A.D. 1862, February 22.—N° 481.

**ORAM, George John.** —(*Provisional protection only.*)—" A " revolving pendant for giving greater security to watches and " lockets against theft."

" I attach the watch or locket to the bow and pendant by means " of a metal tube or solid wire (I prefer a tube) passing through

" the pendant and case, and forming an axis upon which the " pendant, or the watch, or locket revolves. The security con- " sists in the pendant, from the fact of its revolving, offering no " resistance to, but turning with a sudden wrench, which is the " usual mode in which robberies are effected. The usual method " of attaching watches and lockets to bow and pendant, offering " resistance at the weakest part, so that the screw attaching the " bow to the pendant is broken easily, and the watch or locket " stolen."

[Printed, 4*d*. No Drawings.]

### A.D. 1862, February 28.—N° 544.

**AZEMAR, Pierre Destaing.**—" An improved mechanical " arrangement for the winding-up and the setting of the hands " of watches by means of the knob of the pendant."

The axis of the knob is connected, by Bréguet-key click-work, with an axis that, being turned, winds up the watch. An endless screw on the latter axis gears with the pinion of the mainspring arbor. The pendant knob axis is continued towards the centre of the watch, through the screw axis, as a rod with a small endless screw at its extremity that is ordinarily out of gear with the pinion of the minute-wheel arbor, but may be put in gear therewith by the depression of a stud. The said stud projects from the edge of the watch, and its depression actuates " a three-armed or crutch " lever ;" the knee of which has a conical hole, through which passes the lower end of the above-mentioned rod. The third arm of the three-armed lever is connected to the upper part of the Bréguet-key click. After winding up the watch by simply turning the knob of the pendant, the hands may be set by then depressing the stud and turning the pendant knob in the requisite direction, for the upper part of the Bréguet-key click is then disengaged from the endless screw that winds the watch, and at the same time the small endless screw on the rod is brought into gear with the pinion of the minute-hand arbor.

[Printed, 8*d*. Drawing.]

### A.D. 1862, March 7.—N° 618. (* *)

**COATHUPE, Henry Bentinck.**—(*Provisional protection only.*)—" Improvements in the manufacture of clips, hooks, and " other such like fastenings."

These clips may be applied to mercurial timekeepers, but the method of application is not described. They are cut or stamped out of sheet metal "in the form of the letters **H**, **T**, **Y**, or **X**, or " other such like forms;" the portions " separated from each other " (or a series of such pieces in combination)" are folded or bent in such manner that one end is formed into a spike or nail, whilst the other can be employed to clip the article requiring to be held. " These clips may be made of various sizes and substances," and it is stated that their strength is " superior to cast and equal (or " nearly so) to wrought metal fastenings." Mention is made of Letters Patent which were granted on August 24th, 1861, No. 2118, entitled " Improvements in timekeepers."

[Printed, 4*d*. No Drawings.]

### A.D. 1862, March 15.—N° 717.

M<sup>C</sup>ADAM, WILLIAM.—" Improvements in the manufacture of " blocks, pulleys, and weights for window sashes and other " purposes, and in the mode of applying the same."

The said weights may be applied to " shutters, doors, machinery, " gasaliers, clocks, timekeepers, and other uses."

" Instead of using iron or other metal for weights, it is pre-" ferred to make them of the heavier kinds of earthenware. " These weights are either moulded solid, or with an internal " cavity to be filled with 'mine dust' or other suitable mineral " substance, or which may be mixed with the clay for the purpose " of increasing the specific gravity of the weights. Other mine-" ral substances such as stone of various kinds, the cheaper " varieties of marble may also in some cases be employed with " advantage in the manufacture of these weights, or they may be " made of glass if preferred."

In some cases, the said weights may be made of " slag, iron " pyrites, asphalte, pitch, and other similar materials, used in " combination with forge, furnace, and other slags, broken earthen-" ware or glass, granite, quartz, ironstone, and other suitable " mineral substances. These weights may also be made with an " outer shell or casing, formed of earthenware, metal, wood, or " other suitable material, and with the interior filled with any " of the materials before enumerated best adapted for the object " in view."

[Printed, 10*d*. Drawing.]

### A.D. 1862, March 17.—N° 741.

**SMITH, Ephraim.** —(*Provisional protection only.*)—"An im-"provement in watch keys."

This invention "consists in constructing watch keys which "act in a similar manner to those known as 'Breguet's,' but "which are applicable to winding watches, whether the winding is "effected by turning the key from right to left, or vice versâ. In "the Breguet keys a key winding by turning from right to left "will not effect the winding of a watch where the key has to be "turned from left to right."

This "improved key consists of a spindle united to a ball or "other piece free to be turned in a rotary direction upon a pin "carried at the upper part of a guard or cage, which cage is large "enough to allow of the ball revolving within it, and which is "connected at bottom to a collar, within which the upper part of "the spindle is free to revolve."

[Printed, 4*d*. No Drawings.]

### A.D. 1862, April 1.—N° 907.

**GONTARD, Célestin Philippe.**—"An improved stopping-"piece for watches and other timekeepers, intended to limit the "winding-up of the moving spring."

The boss of the barrel arbor is fixed on to the said arbor by means of a screw, its upper part is "hollowed and shaped as a "ring with a notch cut at its periphery, which notch and a pin "or finger projecting before it are to catch with a Maltese cross-"shaped wheel at each revolution when winding up the moving "or mainspring, for the purpose of preventing the breakage of "the said spring more efficiently than the contrivance used to "this day for the same purpose."

"The advantages of this stop or stopping-piece are, firstly, the "barrel containing the mainspring is mounted on an arbor, the "pivots of which are at the greatest distance from each other.

"Secondly, the boss being on the very arbor," both the boss "and ring are perfectly round.

"Thirdly, the part of the Maltese cross-shaped wheel which "bears the stop ring is cut slanting in a reverted way, whence it "results, that when bearing on the stop wheel, the finger presses "the latter to the bottom of the groove instead of raising it, "which preserves the screw and drop (la goutte) on which the

" stop wheel is set." " The finger can run neither over nor under " this wheel to stop the watch, as this occurs most certainly after " some use with the old contrivance." The " improved stop or " stopping piece is of great solidity, lessening the friction, and " moreover it is cheaper in its construction."

[Printed, 8*d*. Drawing.]

### A.D. 1862, April 1.—N° 912.

**KNUDSEN, Frederick.** — (*Provisional protection only.*) — " Improvements in chronometers."

To enable a chronometer to go correctly in extreme temperatures, when it is adjusted for medium temperatures, " auxiliary " bows " are connected " to the arms which carry the compen- " sation bows." " Each of the auxiliary bows like the primary " bows carries a weight or weights the position of which upon " the bows can be varied to adjust the balance correctly, the " auxiliary bows are also like the primary compensation bows " made of two metals, but the metals of which the auxiliary " bows are composed are arranged in the reverse way to the " metals composing the primary bows, the auxiliary bows will " thus upon an increase of temperature move the weights " carried by them away from the axis or arbor, to which the " arms carrying the bows are connected, and upon a decrease of " temperature will move the weights towards the axis or arbor, " the auxiliary bows will therefore tend to cause the chronometer " to gain on a decrease of temperature, and to loose on an " increase of temperature, the primary bows must therefore be " made thinner to counteract this effect and thus for a given " variation in temperature the weights carried by them will move " through a greater space. The auxiliary bows may be connected " to the arms which carry the primary bows in such manner that " the auxiliary bows come either above or below the primary " bows, or they may be so fixed to the arms that they come " outside of the primary bows, but the auxiliary bows must " always like the primary bows, act with perfect freedom in all " temperatures."

[Printed, 4*d*. No Drawings.]

### A.D. 1862, April 8.—N° 998.

**MONCKTON, Edward Henry Cradock.** — " Improvements " in timekeepers."

1st. "Novel methods of regulating the admission of air or gas "at either or both ends of the tubes of atmospheric or gas clocks "by means of stop cocks or screw cocks of various constructions, "and of any suitable material attached to them." For these clocks amalgams in lubricated tubes are preferred. Fluids may be used in lieu of air or gas. A plug of metal, &c., with a hole bored longitudinally through it, may be used as a gravitating medium. The size of the hole may be regulated in the same manner as the orifices of the tubes, or by metallic capsules or india-rubber.

2nd. Keeping time "by placing any suitably adjusted gravi-"tating medium in air, gases, or fluids, when it will gravitate "downwards by its own superior specific gravity." The index may be constructed "by observing the extent of the fall of the "gravitating medium during a given period of time, and marking "the distance and the period on the index."

3rd. Denoting time by placing a tube or rod (weighted at its lower extremity) within spring clips attached to a vertical index. The said tube or rod will then slide by its own gravity slowly through the clips. "An indicator on the tube or cylinder will "point to the hour on the index."

To obtain a very accurate glass tube, the heated tube, fitted with a mandril, may be drawn through a ring.

The orifices of tubes may be regulated by dissolving out metal wire hermetically sealed into them.

[Printed, 4*d*. No Drawings.]

### A.D. 1862, April 17.—N° 1117.

**FLEURY, Victor.**—(*Provisional protection only.*)—"Improve-"ments in clocks and other timekeepers."

This invention consists of "a novel escapement."

"The wheel known as the escapement wheel is cut with "ordinary teeth and moves a pinion; on the rod of this pinion "is placed a small flier, with from three to six long and slender "arms, according to the nature of the wheelwork and clock. "The flier carries (towards its centre) as many pins as there are "main arms. Each arm of the flier has near its extremity a "second small arm, a slight distance from the first. All these "arms carry at their end a small pin, which is intended to beat "upon a small stop-block, and prevent the wheelwork from

" running indefinitely. When the clock is going the indexes " pass in turn, and in these movements the pins which the fly " wheel carries near its centre lift and let fall alternately the " small ratch, which impels the pendulum commanding it either " by an incline or from the side or base.

"The strength of impulsion is proportioned to the resistance " of the pendulum by means of a screw weight on the rod of the " ratch. Once in action with the pendulum this power is constant; or a roller may be placed at the extremity of the arm " of the ratch, which gives the impulse."

The first index "beats when the ratch is raised to its greatest " height, but not falling; the second is on the block during the " impulsion."

During the passage of the second index to the stop block, " the ratch leaves the pin which has lifted it, and presents itself " to give the impulsion. One single beat index may be put on " to each arm of the fly wheel by putting two stop blocks either " in the ratchet or towards the top of the pendulum."

[Printed, *4d*. No Drawings.]

## A.D. 1862, May 5.—N° 1327.

**PERREAUX, Louis Guillaume.**—"Certain improvements in " clocks or machines for keeping time."

1st. "The employment of the weight of falling sand as a " motive power instead of the weights and springs of ordinary " clocks."

2nd. The "apparatus for regulating the flow of sand so as to " give the necessary movements to the hands on an ordinary dial " for indicating the time."

"Each apparatus is formed of three distinct parts; the first " two form reservoirs, one for containing and the other for " receiving alternately the sand; the third is the space between " them, which is adapted to receive the movement of the clock. " The opening for the flow of the sand from the upper reservoir " should be large enough to allow it to pass through so as to act " in an uniform manner on the hands. Three ratchet wheels are " employed which have no connexion with each other; they are " worked by means of clicks or pawls, two of which belong to " the hands and the other to the striking part, and are moved " by levers. These levers are provided at one end with a trough

" adapted to receive the sand, and at the other end with a counter-" weight. When the sand falls into the trough, its continuous " flow destroys the equilibrium, and in falling imparts to the rod " forming the fulcrum of the lever the necessary movement for " pushing forward the clicks or pawls, and turns the wheels of " the hands. The trough then empties into the reservoir beneath " and the counterweight causes it to return to its original position " to continue the same movement until all the sand has run " through."

"The reservoirs of the large clocks are placed on axes one under " the other. In winding up or starting this clock it is simply " necessary to turn it over."

[Printed, 8*d*. Drawing.]

### A.D. 1862, May 12.—N° 1431.

**BUCKNEY, Thomas.**—(*A communication from Armand François Collin.*)—" Improvements in portable 'tell-tale' timekeepers."

The principal features of this invention are:—

1st. These timekeepers have no fixed dial and pointers, but a removeable paper disc revolves with a plate that is actuated by clockwork, thus indicating time and registering duties.

2nd. In other timekeepers, " the impressions of the various type " fixed at the various localities are made upon the revolving paper " dial by the agency of black or coloured transfer material."

3rd. " Type boxes " are " fixed at the various localities " containing a fixed type for making the said impressions. The timekeepers are inserted into the boxes which are secured by a door when not in use.

4th. The fixed type in the various boxes are arranged at different distances from the centre. Annular divisions are formed " upon the back of the paper dial corresponding with the positions of such type, so that the impression of each separate type " is made upon a different annular division on the paper dial."

5th. The revolving plate that receives the paper is attached to the clock movement by a spiral spring, and is therefore capable of springing back to its original position after having been drawn therefrom by a stud.

6th. A screwed nut fixes the paper dial, transfer paper, and pad on to the face of the said revolving plate.

7th. A guard protects the said screwed nut to prevent its being tampered with.

8th. The cover is locked on to the casing of the timepiece by means of a spring bolt, which can only be withdrawn by the action of a certain screw key.

[Printed, 1*s*. Drawing.]

### A.D. 1862, May 14.—N° 1461.

**NICOLE, Adolphe.** — " Improvements in stop-watches and " timekeepers, and in instruments for measuring accurately short " intervals of time."

A wheel on the axis of the seconds hand drives another wheel, the axis of which is capable of rocking a short distance. The rocking arm is pressed on by a spring, which constantly tends to throw the wheel into gear with a wheel on the axis of the extra seconds hand; " but this it is prevented doing except at certain " times by a tail on the arm, which rests on the periphery of a " small notched disc or wheel, having on its axis a ratchet wheel, " which is moved a step forward by each depression of the detent, " so that the extra seconds hand is brought into gear only at " such time as the tail of the arm falls into one of the notches in " the disc." Bearing on the disc is a projection " carried by a " spring, which projection also at times falls into the notches in " the disc, and then the spring comes against a collar on the " axis of the extra seconds hand, and by pressing thereon holds " it still (it being then out of gear)." A projection from another spring also presses on the disc; when this projection falls into the notches, the end of the spring " comes against a heart-shaped " wheel on the axis of the extra seconds hand, and by pressing " thereon brings the hand back to the zero point."

By pressure on the detent, the extra seconds hand is started from a zero point; a second pressure stops the extra seconds hand; the third action of the detent brings the extra seconds hand back to zero. The rising as well as the pressure of the detent may be made active.

The fly-back action of the detent may cause the winding up of the spring which maintains the motion of the train of wheels; in this case the apparatus is separate from a watch.

[Printed, 6*d*. Drawing.]

### A.D. 1862, May 16.—N° 1486.

**ANDERSON, Frederick Bonaparte.** — " Improvements in " watches and other timekeepers."

The object of this invention "is to obtain a maintaining power " with a fixed barrel, whereby the chain and many parts in " watches as now made are dispensed with and other advantages " are gained." The barrel and barrel bar or name plate are formed in one piece; also the ratchet, great wheel, and barrel arbor are in one piece. In the barrel is placed "a collar or nut " with a square space in the centre to fit the square of the spindle " of the arbor;" a hook is formed "on the outer surface of the " nut to take hold of one end of the spring contained in the " barrel, the other end of which is fixed to the side of the barrel." The side of the barrel is formed "with apertures for the reception " of the hook or stud which holds the outer end of the spring in " order that the hook or stud may be shifted from one to the " other, so that the tension of the spring may be regulated. The " tension of the spring may also be regulated by shifting the " collar to which the inner end of the spring is attached on the " arbor." In some cases the barrel and upper plate are made in one.

[Printed, 8*d*. Drawing.]

### A.D. 1862, June 14.—N° 1775.

WIGHTON, William.—"Improvements in apparatus for re" gulating watches and other timekeepers."

A toothed quadrant is attached, by arms, to the ordinary regulator hand; a worm, or screw, on a spindle, gears into the teeth of the quadrant. "The spindle carries also a click or " ratchet wheel, into the teeth of which a spring is made to drop, " the spindle terminates on the outer end in a square, and is " moved by an ordinary watch key. By turning the spindle the " regulator hand is moved to or fro over the ordinary scale " according to the direction in which it is turned. The spring " entering the teeth of the ratchet or click wheel retains the " regulator in the position at which it was set until the spindle " is again turned."

[Printed, 8*d*. Drawing.]

### A.D. 1862, July 10.—N° 1983.

REYNOLDS, William Francis. — (*Provisional protection only.*)—"An improved watch pendant."

"My invention has reference to an improved watch pendant for

" enabling watches or other timekeepers to be worn more safely " than hitherto, by preventing the chain or guard from being " suddenly wrenched off or otherwise disengaged; and consists " in passing the ends of the bow through the ball of the pendant, " and securing the same by riveting or otherwise, so as to prevent " their return, the said ball being formed in two parts for that " purpose, and employed in connexion with the fixed pendant, or " with a swivel movement and solid bows; the object being to " strengthen the bow fastening, and prevent its being forcibly " disengaged from the watch; a spring movement being also " employed for enabling the bow to maintain its relative position " to the watch."

[Printed, 4*d*. No Drawings.]

### A.D. 1862, July 16.—N° 2038.

**BODMER, Louis Rudolph.**—(*A communication from Auguste Rossel.*) — (*Provisional protection only.*) — "Improvements in " apparatus for winding up watches and other timekeepers."

This invention relates to apparatus for winding up watches without the use of a key.

One end of a chain " passes through the handle or knob of the " watch, where it is secured to a steel pin with head which fits " into a socket of the watch knob or handle. This chain is wound " round a grooved pulley, which latter fits upon a bush upon the " square arbor of the mainspring barrel. Upon this bush is fixed " a ratchet wheel, into which takes a pawl moving round a stud " on the chain pulley. The chain pulley is provided with teeth " on its circumference, which gear into the teeth of a wheel turning " loosely round a bush of a square stud fixed to the watch " plate.' The body of this wheel forms or has attached to it the " barrel of a second spring, one end of which is fixed to the " bush, and the other to the circumference of the barrel in " the usual manner. On taking hold of and drawing out the pin " head of the chain which rests upon or fits into the watch knob, " the pawl on the pulley taking into the ratchet wheel carries " round with it the mainspring barrel, thereby winding up the " mainspring, and at the same time the second spring above " referred to is wound up. When the hold on the chain is relaxed " this second spring will turn its own barrel and wheel, and there- " with also the chain pulley in the opposite direction, and thus

" again wind up the chain round its pulley, the catch gliding " during this latter operation over the teeth of the ratchet " wheel."

[Printed, 4*d*. No Drawings.]

A.D. 1862, August 15.—N° 2305. (* *)

JOHNSON, JOHN HENRY.—(*A communication from John Henry Koosen.*)—" Improvements in electro-magnetic timekeepers."

This invention relates to " a galvanic chronometer with centri- " fugal regulator."

1st. The " electro-magnetic machine " for working the chronometer.—Three vertical horseshoe electro-magnets have their poles equidistant in the circumference of a circle, the poles of the same name being alternate, and the poles of the same horseshoe magnet being opposite to one another. The actuating spindle of the machine is also vertical in the centre of the above-mentioned circle, and carries two soft iron bars which form the armatures of the electro-magnets, and are at right angles to each other. The several electro-magnets are magnetised successively, and " no " absolute interruption of the galvanic current can ever take " place." A modification of the wheel commutator regulates " the entrance of the current into the different coils ;" gilt plates, suitably connected by silver wire, are arranged upon a stationary wooden ring, and a brass arm, on the central actuating spindle, completes the requisite circuits during its revolution.

2nd. A " centrifugal regulator."—A steel rod, with brass balls, is pivoted at its centre of gravity, in a metal ring attached to and concentric with the main vertical axis. At a proper velocity the centrifugal force of the steel rod is exactly balanced by a blade spring in the electric circuit, but, if the speed increases, a wire on the rod breaks contact with the spring and interrupts the current ; this latter action causes a slackening of speed until the wire again makes contact with the spring.

A Daniell's battery with horizontal plates and thick diaphragm of paper fibre is used, and more than one chronometer can be worked with the same battery.

[Printed, 10*d*. Drawing.]

A.D. 1862, August 16.—N° 2306.

BARCLAY, ROBERT.—(*Provisional protection only.*)—" Improvements in chronometers and other timekeepers."

1st. "Causing the lever or vibrating bar acting as the detent " or pallet of repose, instead of being actuated through a deli- " cate spring, to be acted upon in one direction by a second " rigid arm or lever jointed or connected to it in such a way as " to be free to move away from it in the other direction. In one " modification the pallet of repose has fixed on its spindle two " short arms, near the ends of which is pivoted the second or " lifting lever. The lifting lever is formed with a projection " which, when the lever is moved in one direction, comes in con- " tact with the spindle or other part of the pallet of repose, and " causes the latter to be lifted. The movement of the pallet of " repose in the opposite direction is limited by a stop pin, whilst " the lifting lever is free to move as much further as may be " necessary by turning on its own pivot in the arms of the pallet " of repose. To return the parts to their normal positions after " each lift, a simple curved spring requiring no delicate adjust- " ment is made to bear upon an angle formed on the lifting " lever."

2nd. "An arrangement dispensing with the chain, by which " the force of the spring is ordinarily communicated to the fusee, " and in carrying out this part of the invention according to one " modification, a series of teeth are formed in a conic helix or " spiral round the spring barrel or round a barrel driven from " the spring barrel, and a corresponding series of teeth are formed " in a conic helix or spiral round the fusee."

[Printed, 4*d*. No Drawings.]

## A.D. 1862, August 21.—N° 2339.

**BOUBÉE, ADOLPHE.**—(*Provisional protection only.*)—" Improved " apparatus for casting or moulding glass and imitating precious " stones or marbles."

"By means of this invention various useful objects can be " produced, such as handles for umbrellas and walking sticks, " ornaments, lamp glasses, watch glasses, and figures."

The inventor uses "a mould formed in two halves, which are " connected together by a hinge or a spring joint, in order that " the molten glass from a furnace may be poured or placed " therein and compressed by a screw or clamp so as to receive " the shape of the mould." "For handles of sticks or umbrellas, " the mould should be furnished with a mandril passing up the

" centre, so that the handle shall be moulded with a tubular " aperture in the centre to receive the stick. While the glass is " in the mould the workman should roll the mould upon an " iron plate or bracket in order that the glass may become " annealed. In order to form lamp glasses and watch glasses, " the mould being shaped accordingly, I take the molten glass " from the furnace by means of a hollow iron tube and insert " the mass into the mould, I then blow into the tube, whereby " the glass is expanded and forced against the circumference of " the mould."

[Printed, 4*d*. No Drawings.]

A.D. 1862, September 9.—N° 2478.

**RAINIER, PETER.**—(*Provisional protection only.*)—" Improvements in watches, chronometers, and other timekeepers."

" The object of the improvements is, that whilst the watch, " chronometer, or other timekeeper by the hands or pointers is " set to indicate Greenwich or other particular time, it may also " by the same hands or pointers indicate other local time or " times. For this purpose, in addition to a fixed dial for moveable hands or pointers as heretofore, and which may indicate " Greenwich or other particular time," the inventor applies " another series of figures upon a separate rim or surface, which " may be shifted round the centre of motion of the hands or " pointers, and yet be held in grooves or other guides, and " retained as set by spring or other stop, so that the respective " figures of such extra series may in their relation to the other " set of figures indicate the difference of time between any two " distant places. If desired the dial may revolve to a stationary " rim. And two or more such extra rims or series of figures " may be employed, each capable of being moved and of being " set independently of the other, so that the same hands or " pointers may indicate the times of three or more distant places. " The extra rims or series of figures may be applied to the dial " or to the case of an open-centred hunting or Crimean watch, " or to both of them."

[Printed, 4*d*. No Drawings.]

A.D. 1862, September 17.—N° 2551.

**NEWTON, WILLIAM EDWARD.**—(*A communication from Henri Du Pasquier.*)—" Improvements in watches or timekeepers."

This invention "relates to that description of watch which is
" wound up without a key, and by merely turning the pendant,
" and it relates more particularly to that part of the gearing
" whereby the hands of the watch are moved over the face to set
" them at the right time.

" The movement of the hands has been heretofore effected by
" means of wheels acting directly on the minute wheels. The
" present invention consists in the use of an intermediate wheel
" for actuating the hands or their spindles. This wheel, and
" also that which actuates the barrel, are mounted on a rocking
" frame, so that either of them may be thrown in " [or?] " out of
" gear with their respective parts, the normal position of the parts
" being that the winding-up wheel is always kept in gear with
" the barrel. When it is required to set the watch by altering
" the hands, the winding-up wheel is thrown out of gear, and
" the same action will throw the other wheel in gear, and thus
" the watch can be set by turning the pendant, and thereby
" actuating the hands by means of the intermediate wheel."

[Printed, 6*d*. Drawing.]

### A.D. 1862, September 27.—N° 2634.

HENRY, MICHAEL.—(*A communication from the Société Chartier et Compagnie.*) — " Certain new and improved applications of
" petroleum and its products, certain agents produced by combining the same with other substances, and certain modes of
" treating caoutchouc, gutta percha, and their compounds and
" substances, similar thereto."

In carrying out this invention, "mixed petroleum" may be employed with advantage. "Mixed petroleum" consists of a combination of the three following products obtained from American petroleum :—1. " Hydruret of caproylene" [hydride of caproyl?] ; 2. A clear colourless liquid "boiling at about 203° ;" 3. " A heavier clear colorless liquid distilling at about 320°." The degrees of temperature are Fahrenheit's.

" One object of this invention is the removal of spots or stains
" of grease, wax, oil, fatty acids, and like matters, and the
" cleansing of clockwork and wheelwork, lithographic stones,
" cylinders, printers' types and forms, and other surfaces. For
" these purposes according to this invention mixed petroleum or
" other rectified or refined petroleum is employed, or an agent

" or compound is employed, produced by combining mixed or " other rectified or refined petroleum with nitro-benzine or other " fragrant or perfuming agent, 980 parts mixed petroleum and " 20 parts nitro-benzine (mirbane) are suitable proportions, the " ingredients should be mixed together; the proportion of nitro-" benzine or other perfuming agent may be increased or reduced " at pleasure."

[Printed, 6*d*. No Drawings.]

### A.D. 1862, October 14.—N° 2768.

**REID, David, and REID, Christian John.**—"Improvements " in the manufacture of cases for watches and other pocket time-" keepers."

This invention consists in the manufacture of the said cases of an alloy of copper and aluminum; 92½ parts of copper, and 7½ parts of aluminum are preferred.

The copper is melted in a crucible, and the aluminum is added thereto, keeping the mixture in the furnace and well stirred until the metals are thoroughly mixed. The resulting ingots are preferably rolled on the side, at a red heat, and frequently annealed. A portion of the plate of a certain thickness is cut "into narrow " strips for bizzles and edges, and also wire for pendants and " bows; the remainder is rolled into thinner plates for case " backs, bottoms, and domes. The various parts are soldered " together with solders of the following metals of gold, silver, " brass, copper, zinc, or aluminium."

Before soldering the parts together, the edges and surfaces which are to be soldered may be subjected to the action of hydrochloric acid. Fluxes of borax and other substances are used in soldering.

"The cases when made are polished and finished in the usual " way by brushing and lapping with an application of rotten-" stone or oxide of aluminium, and finally with rouge applied " with spirits of wine. The cases are ornamented by engraving, " chasing, or engine turning, and a dead matted surface is pro-" duced by the use of caustic soda or nitric acid."

[Printed, 4*d*. No Drawings.]

### A.D. 1862, October 25.—N° 2878.

**CLARK, Andrew.**—(*Provisional protection only.*)—"Improve-" ments in the construction of bows and pendants of watches."

"This invention consists of certain improvements in the con-
" struction of the bows and pendants of watches, the object
" being to prevent the same from being detached from the watch
" by twisting them, and to prevent the felonious abstraction of
" the watch from the wearer by such means.

"I propose to form the ball of the pendant of the watch in
" three divisions, the lower division of which is a fixture on the
" pendant, the central division being a swivel, and the upper
" division cut with a screw thread, or fixed on to the pendant
" by hammering or enlarging the head of the letter. The bow
" of the watch is to be attached to the swivel or central division
" of the ball by its insertion therein, and by a pin, or a nut, or
" other fastening adjusted thereto. The pendant is of course to
" be made hollow to admit of the push pin moving therein, in
" order to actuate the spring which opens the watch, but the
" bow of the watch must not penetrate beyond the swivel, so as
" to leave the tube of the pendant free from the contact of the
" bow."

[Printed, 4*d.* No Drawings.]

### A.D. 1862, November 22.—N° 3144.

**POWELL, Charles.**—"Improvements in watches and other " timekeepers."

Watches made according to this invention "have neither fuzee, " or barrel, or barrel bar (or name plate)." The mainspring is let into the pillar plate at the back, the said pillar plate being made of sufficient thickness for that purpose. The pillars are screwed into "blind holes." The outer end of the mainspring is fastened to the pillar plate by a hook which is let into a round hole in the said plate. The arbor is inserted through the spring at the back of the plate, and through a boss in the said plate; the large part of the arbor has a hook to catch the spring at the centre. A cover with a step supports the arbor, it (the cover) being screwed on the back of the pillar plate. On the inside of the plate the great wheel is put upon the arbor; the maintaining-power spring is let into a groove in the great wheel, and the maintaining-power wheel "is put on the great wheel and the maintain-
" ing spring; the maintaining power wheel has a new click and
" spring in one piece, and formed in a circle." "The ratchet is
" then put on the maintaining wheel on the arbor or shaft and

" pinned down, binding the whole with a pin across the ratchet " and arbor; the arbor then passes through the top plate for " wind up square."

According to another plan, the mainspring may be fitted " in " a hollow inside the pillar plate."

[Printed, 6*d*. Drawing.]

A.D. 1862, November 29.—N° 3198.

GEDGE, WILLIAM EDWARD.—(*A communication from Pierre Louis Rabiet.*)—" Improvements in the construction of clocks or " timekeepers."

"This invention offers with fewer pieces less gearing and less " trouble " than is ordinarily required, " a movement which will " march perfectly without ever requiring winding up."

" The most important parts " of the Specification are :—

1st. " The establishment of the striking work in the centre " of " the clock frame.

2nd. " The suppression of the first wheel of the movement."

3rd. " Replacing this wheel," the spindle, pulley, clockwork, and weight by a watch spring that winds up " by the action of " the striking work."

4th. " Suppression of the second wheel of the movement by " means of a toothed gearing carried by the first wheel of the dial " work."

5th. " Setting the motor by the large hand."

6th. The " main detent " is replaced by a rod that carries a " hook scapement," and an arm; the latter is connected with the striking mechanism.

7th. " Three species of anchor escapement."—In one, the hooks are bolted on the stem of a cross bar. In the second, one of the arms of the cross bar is bent on itself to form a hook, the second hook is bolted to the cross bar. In the third escapement, the cross bar, by being suitably bent, forms the necessary hooks.

8th. " A stop piece " forces " the movement to travel conjointly " with the striking work."

9th. " Suppression of the key by a counterweight."

10th. " Establishment of a spring with four branches and " reservoir."

11th. " This invention more nearly approaches constant power " than any other spring clockwork hitherto invented."

[Printed, 8*d*. Drawing.]

### A.D. 1862, December 1.—N° 3222.

JOHNSON, **Edward Daniel.**—"Improvements in pocket "watches."

1st. Indicating the time in the dark.—A movable disc, forming a false back to the case, carries a spring catch which is arrested by a chamfered slot carried by a twelve hours wheel; by comparison of the arrested position of a stud on the outside of the disc with certain projections in the rim of the watch case, the time is ascertained. In a modification of the above arrangement, a spring catch on the wheel comes into contact with a stud attached to the disc.

2nd. A mode of making "black dials."—The dial is made a pure white plate and the figures are painted in black; the centre of the whole dial is then cut out in the lathe and replaced "by a "plate of solid black enamel." This improvement is not mentioned in the Final Specification.

3rd. Obtaining "photographic seconds."—This is a temporarily operating seconds hand "to be found always at zero unless in "use." Besides the ordinary seconds wheel, a loose wheel is mounted upon the seconds pivot. The loose wheel (on being turned round) coils up a spring which, when released, returns the wheel to zero. The pinion which engages both the seconds wheels is mounted on a bar moving on a stud; when a stud which passes through the watch case is pressed, the pinion is placed in gear with both wheels, and the seconds hand starts forward. This improvement is called the 2nd improvement in the Final Specification.

[Printed, 10*d*. Drawing.]

### A.D. 1862, December 16.—N° 3364.

JÖRNS, **Heinrich.**—"Improvements in clocks or timepieces."

"This invention is designed for obviating the necessity for "winding up clocks or timepieces periodically." A clock is wound up "continuously" by means of the current of air caused by "changes of temperature," "which are constantly taking place "both inside and outside of dwelling houses."

A flue or chamber has inlet and outlet passages for the air, the outlet passage being made through the wall of the house and fitted with a flap valve, and the inlet passage being fitted with

" an ordinary revolving ventilator." Upon the axis of the ventilator "a worm is formed, which gears into a worm wheel for " imparting rotary motion to wheelwork for winding up the going " weight of the clock by means of an endless cord passing over " a series of pullies suitably placed."

If the clock be only partly wound up, the flap valve will be open, the current of air established, and the revolving ventilator rotated. The going weight of the clock will thus be raised to its full extent, " by which time a hook will have been brought into " action and lifted a sliding piece of metal and weighted lever " connected to the outlet passage aforesaid, and by these means " close said air passage, by which the action of the ventilator " will stop, and the winding up of the clock cease until the going " weight aforesaid again descends by its gravity, by which the " outlet passage will be again opened," and the weight raised. This successive action causes the operation of winding to be " in " effect self-winding."

[Printed, 10*d*. Drawing.]

### A.D. 1862, December 30.—N° 3474.

**ANDERSON, FREDERICK BONAPARTE.**—" Improvements in " watches and other timekeepers."

This invention " consists in constructing those parts of watches " and other timekeepers known as hollow fusees, and as stops " to prevent the mainspring from being overwound."

A disc is formed on the arbor " in a piece with it," and a recess is sunk " in the outside of the fusee brass, into which the " disc is fitted and secured by soldering or other attachment." A square is formed on the back of the arbor to receive " a " gatherer or stop which works inside a split ring formed with " three or more teeth, and with an abutment on the inside " thereof. As the watch is wound the gatherer takes round a " tooth at every complete revolution until the spring is wound " up, when the gatherer comes in contact with the abutment, " and prevents overwinding. The split ring is encased in a box " fastened on to the back of the pillar plate."

" Another form of hollow fusee, in which also the cap and inside " stopwork are dispensed with," has " the ratchet with the arbor " screwed on at back."

" Instead of forming the teeth on the inside of a split ring," *in some cases* a toothed disc is employed. A spring is attached

" to the back of the pillar plate, which presses upon the side or " top of the disc and retains it in position." " A strong circular " projection or 'lob' " is left in the centre of the ordinary recess or hollow on the under side of the upper plate, and a slot is cut between the fusee and the barrel to form a passage for the chain.

[Printed, 8*d*. Drawing.]

A.D. 1862, December 30.—N° 3479.

CLARK, WILLIAM.—(*A communication from Léon Foucault.*)— " Improvements in governing apparatus."

The governor which forms the subject of this invention is an arrangement of Watt's governor in which the time of revolution is independent of the angle of divergence of the balls. The collar of the apparatus that slides on the vertical spindle has, for this purpose, a varying pressure applied to its underneath surface, which pressure is determined according to the weight of the balls and the angle formed with the horizontal line by the bar through which the pressure is applied. The isochronism of the instrument for all variations in the said angle of divergence is thus ensured. To accomplish the varying pressure, a weight acts (through a bent lever) on the said bar.

In applying this instrument to astronomical or chronographic purposes " the variable resistance intended to overcome the excess " of motive power, is furnished by means of a fan " " of small " dimensions, the orifices of which are opened and closed by the " action of the regulator itself."

To eliminate the influence of passive resistances inherent in Watt's governor, the underneath surface of the above-mentioned collar is undulated at two points. This surface on sliding above the pin (at the extremity of the bar) which bears upon it, " imparts " an alternating motion to all parts of the apparatus, by means of " which each of the parts of which it is composed, in oscillating " round its mean position will accurately transmit the smallest " force which actuates it. In order to render it effective the " undulations should not be too deep."

[Printed, 1*s*. 4*d*. Drawings.]

## 1863.

### A.D. 1863, January 20.—N° 170.

**BONNEVILLE, HENRI ADRIEN.**—(*A communication from Tony Pocachard.*)—(*Provisional protection only.*)—"Improvements in "the manufacture of clocks."

"This invention consists in regulating the working of clocks "by means of the oscillations of a spiral spring with a circular "balance wheel, instead of an ordinary pendulum."

The drawings show the balance wheel and spiral spring in front of the clock face. The escape wheel is a crown wheel on a vertical axis near the upper part of the clock; it drives a horizontal axis by means of two pallets thereon, which catch alternately in the teeth of the said escape wheel. Attached to the pallet arbor is a "rack" carrying underneath it the toothed arc of a circle. The teeth of the arc actuate a pinion on the balance-wheel axis. "The isochronal oscillations derived from the elasticity of the "spiral spring fastened to the balance wheel regulate the working "of the clock."

[Printed, 6*d*. Drawing.]

### A.D. 1863, March 6.—N° 633 (* *).

**JOURDIN, MICHEL.**—(*Provisional protection only.*)—"Improvements in machinery for engraving by means of electricity."

"The pattern intended to be reproduced is first engraved by "hand or by any other process at least four times larger than the "engraved plate required. This pattern plate is filled up with an "insulating material, and it is adjusted on a frame connected "with the machine. In front of this plate thus prepared and "adjusted to the frame is placed a small metallic point, made "slightly to press upon it and in communication with one of the "poles of an electric battery. On another frame is adjusted the "metallic plate or any other object to be engraved, such as watch "cases, dials, jewellery, or other articles. In front of this is "placed a small graver pressing on the article to be engraved, or "being pulled from it through the medium of an electro-magnet. "*Both of these* frames are always turning during the operation,

" but the metallic point in front of the pattern frame, and the " graver in front of the other frame, are both susceptible of " moving in a longitudinal direction, but do not advance with the " same speed, their speed depending on the relation between the " size of the pattern plate and the plate to be engraved; this " motion is obtained by the use of two wheels placed the one " with the slide supporting the point in front of the pattern, the " other with the slide supporting the reproducing graver."

[Printed, 4*d*. No Drawings.]

### A.D. 1863, March 21.—N° 760.

APPLEGATE, Frank.—(*Provisional protection only.*)—" Im- " provements in time indicators."

This invention " consists in the application of revolving discs " on which to represent the progress of time instead of hands as " in a clock or watch, such discs being so combined, arranged, " and prepared as to show the time as used and indicated in rail- " way time tables." The discs are placed edge to edge, two or more discs being used for hours and minutes; the hours are marked on one disc and the minutes on the other. The hour numerals may be repeated twice in the circumference. " These " discs work in unison and are actuated by a spring or weight, " train and clock gear so as to make what is termed dead beats or " movements."

" A second disc may also be combined with this time indicator " to show the seconds by dead beats, as will be readily understood. " These discs are obscured from view in the clock or watch face " except so much as appears through a small aperture in the face " which shows the hour and the minute, as 2.20, 4.40, 5.59, and " so on, another aperture being provided for the seconds disc, or " it may even be shown through the same opening. For watches " which may be very small or for clock faces, which it is desirable " should be seen at great distances," the inventor applies " a " bull's eye or magnifying glass on the clock or watch face, which " shall magnify and render the indications of time much more " visible than if left unmagnified."

[Printed, 4*d*. No Drawings.]

### A.D. 1863, May 6.—N° 1131.

MACKELLEN, Samuel Dunseith.—" Certain improvements " in watches and other timekeepers."

"The invention relates to that part of watches and timekeepers "known as the escapement, and is designed to dispence with the "'escapement wheel' as employed in the ordinary 'duplex "'escapements.' The invention consists in the use of a horizontal plate or 'fly,' furnished with one, two, or more pointed "arms or long teeth, such 'fly' being mounted upon a central "vertical shaft carrying a pinion which gears with a toothed "wheel, and is driven by the ordinary train of wheels in connection with the 'finger.' These pointed arms or teeth as they "revolve take successively into the slot in the balance wheel "shaft (which is used in the duplex escapement), and passing "out of the slot form the escapement. Upon the 'fly' are "secured two or more vertical 'ruby pins,' termed 'impulse pins,' "so arranged that as the escapement takes place they strike a "projecting finger on the balance wheel shaft, and give motion "and impetus to the balance wheel, and thus a simple description "of escapement is constituted. By this means the complicated "duplex escape wheel is altogether dispensed with, and the usual "'ruby roller' is rendered unnecessary, as by using the toothed "'fly' the force is diminished so much that the friction on the "shaft is very slight. This also permits a wider notch to be cut "in the shaft."

The beat is "regulated by the number of the 'fly' teeth and "impulse pins."

The drawings show a fly with four impulse pins.

[Printed, 8*d*. Drawing.]

### A.D. 1863, May 28.—N° 1339.

**LAEDERICH, Charles Eugene.** — "Improvements in "watches."

This invention relates to winding up a watch and setting the hands, by the rotation of the knob of the pendant.

The spindle connected to the knob "may be pushed forward or "backward, and kept fixed by a stop." A pinion fixed at the opposite end of the spindle takes into a conical wheel, to which latter is fixed a spur wheel in gear with the ratchet wheel that works the winding-up axis. For setting the hands, the spindle is pushed forward till the pinion is brought in gear with a wheel that gears with the pinion "working the minute hand." To the said wheel is fixed the pinion in gear with the wheel "working "*the* hour hand."

This arrangement "offers the following conspicuous points":— 1. The winding up "requires but very little turning of the " spindle." 2. "For setting the watch hands the operator re- " quires the use of one of his hands only." 3. "The arrange- " ment may be applied to any description of watches, as well " above as underneath the pallet or pillar plate of the same."

[Printed, 10*d*. Drawings.]

### A.D. 1863, July 7.—N° 1690.

**REED, George Potter.**—"Certain new and useful improve- " ments in watches or timekeepers."

1st. An arrangement and combination "of a circular, segmental, " or other proper shaped detent, and a detaining and impulse " pallet with a vibratory lever, and either two toothed wheels or " one wheel having two sets of teeth, the whole being applied to " the balance of a watch or timekeeper, and so as to operate " together and with such balance."—Between the escape wheel and the balance wheel is a vibratory lever, whose axis also carries the said segmental detent. The said vibratory lever also carries the pallet that receives the impulse from the double-toothed escape wheel, and, at its inner end it is bifurcated to receive a pin extending downwards from an arm on the balance-wheel axis. A notched roller, also on the balance-wheel axis, serves as a stop for the vibratory lever after each movement of the above-mentioned pin out of the fork of the said vibratory lever. In a modification of this escapement the centre of the vibratory lever is in a line between the axes of the escape wheel and balance wheel respectively.

2nd. "An independent seconds mechanism."—The seconds pinion and the seconds-hand arbor are in two separate parts. The gear wheel is fastened to the hollow pinion, and the said arbor is provided with a shoulder below and a collar above the pinion; a helical friction spring surrounds the arbor between the wheel and the collar. Whenever a stopper is pressed against the collar, the arbor, and therefore the seconds hand, ceases to rotate.

[Printed, 8*d*. Drawing.]

### A.D. 1863, July 9.—N° 1715. (* *)

**NEWTON, William Edward.**—(*A communication from Felix Richard.*)—"Improvements in barometers or gauges for measuring " the pressure of fluids."

This invention chiefly relates to those barometers on the principle of the aneroid barometer. "Taking these improved barometers "as his principle the inventor has constructed a number of compound instruments which form the subject of the present invention, and which may be enumerated as follows:—Barometer, "watch or clock, and compass, barometer and watch or clock; "barometer and compass, or a thermometer with the same accompaniments."

The drawings show a compound instrument "comprising a "barometer with watch or clock movement and compass," the vacuum box or chamber being mounted (together with its transmission mechanism) between two metal plates, and the whole enclosed in an outside case. A box or case enclosing the watch movement, and another case containing the compass needle, are fixed upon one of the said metal plates.

Another figure in the drawings "represents in outside view an "analogous apparatus, which comprises a barometer connected "with one of the two others, a watch or a compass."

"If instead of creating a vacuum in the box or chamber" "it "be filled with a liquid capable of considerable dilatation, such "as alcohol," "the barometer will be immediately converted into "a thermometer, which may be made a compound instrument by "combining it with either a watch and compass, or a watch or "compass only."

[Printed, 2*s*. Drawings.]

### A.D. 1863, July 21.—Nº 1828.

**BROOMAN, Richard Archibald.**—(*A communication from Adrien Philippe.*)—"Improvements in watches and other time-"keepers."

"This invention consists of improvements in the springs and "barrels of watches and other timekeepers," "whereby the "mechanism known as the fixed stop may be dispensed with."

The spring is made as an ordinary watch or clock spring, except that part which is to become the outer layer of the coil; the said part is formed "thicker than the remaining portion of the length "thereof. This increase in thickness ensures a sufficient pressure "to allow the rolling of about six turns or layers before the last "layer slides against the interior face of the barrel." The interior cylindrical face of the barrel has one or more channels, and a

projection is fixed at the outer end of the spring; the said projection "fits exactly into one or other of the channels." "When
" the spring is fully wound this projection falls into one of the
" channels and produces a slight click sensible to the ear and to
" the touch, thus the person winding is advised that the watch is
" fully wound." In some cases an analogous effect is produced
" by means of a steel hoop independent of the spring and armed
" with a projection. This hoop also performs the function of the
" spring thickened at the outer end before mentioned. The hoop
" is provided with a hook to which the ordinary spring is attached,
" and upon the spring being wound it causes the hoop to slide
" and the projection thereon to enter the nearest channel in the
" interior cylindrical face of the barrel, making the click to indi-
" cate the full winding of the spring."

[Printed, 8*d*. Drawing.]

### A.D. 1863, August 26.—N° 2107. (* *)

**FATTORINI**, SANTINI.—(*Provisional protection only.*)—"A
" new division of time, and the application thereof to mathe-
" matical and other instruments."

The said application may be made to "either mathematical,
" philosophical, nautical, optical," or other instruments, "such as
" to the universal meridian, the sea and geometrical compass,
" longitude and latitude maps, the celestial and terraqueous
" globes.

"The division of the scales will be made in conformity with the
" formula which determines the proportion that as four is to six,
" so eight is to twelve, and as twelve is to eighteen, so is sixteen
" to twenty-four, and so on with regard to the numbers of the
" squares to infinity.

"The division of numbers or scale formed according to this
" series of proportions is applicable to the following instruments,
" namely, the universal meridian, the sea and geometrical com-
" pass, the longitude and latitude of maps, the celestial and
" terestial globes, the protractor, the chronometer, pendulum, and
" watch, the sextant, octant, and circle, the graphometer, the
" barometer, the thermometer, the meter weights and measures,
" and the universal almanack, thus creating a new division of
" time and space, the desired result being attained by describing
" a circle around a square, and then a square about the circle,

" and so on, thereby increasing the scales or divisions on each " circle in the various proportions before-mentioned."

[Printed, 4*d*. No Drawings.]

### A.D. 1863, August 31.—N° 2150.

**GEDGE, William Edward.**—(*A communication from Charles Jaeger.*)—(*Provisional protection only.*)—" An improved watch."

"The watch the subject of this invention is improved in its " escapement in the arrangement for winding from the pendent, " and in that for setting the hands."

In the arrangement for winding from the pendant, a crown pinion, on the axis that passes through the knob of the pendant, gears with another pinion which gears with a "ratchet wind " wheel" on the winding axis.

To set the hands, a steel rod, with a mushroom head on the outer end and an endless screw on the other, passes through an aperture in the edge of the watch. The inner bearing of the said steel rod is upon another rod that also passes through the edge of the watch. When the button of the latter rod is depressed, the endless screw is placed in gear with the wheelwork of the hands, and they can be set by turning the mushroom head; ordinarily the endless screw is out of gear with the wheelwork.

In the escapement, an impulse plate with a "ruby lever" is fixed on the balance-wheel axis; this axis also carries, on the same side of the balance wheel, a "disengaging finger." The "anchor" which acts as a detent is fixed in an inclined position on a "fork " terminating on one side by a broken circle, on the other by a " square piece." The disengaging finger works the anchor by means of two gold blades screwed to the square piece of the fork.

[Printed, 1*s*. 4*d*. Drawings.]

### A.D. 1863, September 4.—N° 2184.

**KELVEY, Charles Grant, and HOLLAND, William.**—" Improvements in the construction of chronometers and other " timekeepers."

This invention relates "to the construction and arrangement " of certain of the working parts which constitute the escape- " ment, and to the use or addition of a moveable plate for " *adjusting* escapements of different kinds."

In the escapement that is constructed according to this invention, the ruby roller and the impulse roller are like those employed in a duplex escapement; the escape wheel is the same as that used in the ordinary chronometer. The pallets will not detach like the "lever," but will give impulse; "both ends of such " pallets are made or formed with inclined planes and with " inclined planes only, and the escape wheel drops thereon, and " gives impulse alternately to the opposite ends." The lever which is connected to the pallets has "a blunt pointed end instead " of the fork or notch now in use. In action the pallets detain " the escape wheel, and at the same time press the point of the " lever gently on the ruby roller secured to the axis of the balance, " thus communicating impulse to the balance at the time it is " unlocking or setting at liberty the escape wheel, which, when " released, gives its next and direct impulse to the balance by the " pallet fixed in the impulse roller."

For adjusting the escapements of watches and other timekeepers, "a detached 'cock' on the pillar plate is fitted with or " there is attached thereto a moveable piece or plate, in which " there is an aperture or space for the pallet axis."

[Printed, 8*d*. Drawing.]

### A.D. 1863, October 8.—N° 2463.

CHARPENTIER, Amédée Paulin.—(*Provisional protection only.*)—"Improvements in the manufacture of watches."

The object of this invention "is to set or time the watch with" out opening the case or cases, putting the pendant into or out " of gear with the setter by the movement of the lunette glass " and its rim (which latter is made without the usual joint or " hinge) or if the watch be a hunting watch by the upper or " lower case. The effect may be produced by a spring, by the " addition of an arm, or by the application of a ratch, but the " one or the other always having for mission to advance or put " back the spring guiding the wheel gearing with the setter." The lunettes, by preference, "act on the spring arm or ratch by " means of a small cavity made in, or an incline given to them.

"To operate, place the back of the watch flat in the palm of " the hand, press the lunette round to the right (or vice versa " in some cases) with the finger and thumb and the setter " is in gear, then by means of the pendant move the hands to

" the time required, press the lunette back to the left and the " watch is set. If the pendant be turned after the lunette has " been moved back to the left such rotation will have no effect on " the hands or any part of the works."

[Printed, 4*d*. No Drawings.]

### A.D. 1863, October 23.—N° 2612.

MARRIOT, Benjamin.—(*Provisional protection only.*)—" An " improvement in watches, consisting in the construction of " cylindrical dead beat independent centre seconds' watches."

In this invention, the extra centre seconds hand is " divided by " a cylinder, thereby giving the dead beat. The dead beat " independent seconds' hand is brought to the centre by making " a passage through the centre pinion arbor, the lightest action " being given to it by a very fine pivot, which carries the centre " seconds' hand."

" This invention is made from the ordinary three-quarter plate " movement with two additional wheels, which are seen on the " upper plate receiving their impetus from the second power, viz., " the centre wheel, the one power and one winding from fusee " and barrel suffices to work both with ample force, these two " additional wheels being so affixed that by a touch of the side " push piece attached to the stop work it becomes detached from " the going department, niether adding to nor diminishing the " force thereon." All the force required is taken " from the " second power, viz., the centre wheel." Two additional wheels are introduced, " one of which divides itself upon a cylinder " thereby causing the dead beat."

[Printed, 4*d*. No Drawings.]

### A.D. 1863, October 28.—N° 2675.

BROOMAN, Richard Archibald.—(*A communication from Felix Cenoni Bouscatié.*)—(*Provisional protection only.*) — " Improvements in clocks, watches, and other timekeepers."

A guard plate is fitted in front of the pillar plate; through the said guard plate " a spindle passes with a groove formed on part " of its length." " This spindle carries near its front end a " balance wheel, and in front of the wheel a spiral spring. Below " the spindle are two other spindles carrying two ratchet wheels " *the teeth of* which are arranged inversely. At each oscillation

" of the balance wheel a tooth of one of the ratchet wheels enters " the groove before mentioned, and the necessary impulse is thus " given to the spiral spring to make it move to the right and to " the left alternately, and therefore give isochronism to the oscillations. The spindle of one of the ratchet wheels is prolonged " at back and carries behind the pillar plate a pinion in gear with " a wheel which is in connection with the mechanism for moving " the hands. Behind each of the ratchet wheels there is a " toothed wheel in gear one with the other, and rendering the " movement regular. The movement is visible through the space " made in the dial plate."

The invention also consists in a method of attaching the spring to the barrel. Into a notch in the centre of the barrel one extremity of the spring is hooked; the spring is fixed in the notch by a pin. "The other extremity of the spring is fixed " against the side of the barrel by means of a hook." To prevent it unhooking, the outer end of the spring is passed through a staple "before being attached to the hook."

[Printed, 4*d*. No Drawings.]

### A.D. 1863, November 2.—N° 2711.

NEWTON, WILLIAM EDWARD.—(*A communication from Michel Ange Bosio.*)—" Improvements in clockwork movements."

This invention relates "to a novel arrangement or combination " of escapement movement or regulating mechanism without " escape wheel, having a constant and direct force." The arrangement is denominated a "tempometer."

The pendulum, detent, and clockwork are each respectively independent of the other. The pendulum rod is provided with an upper and a lower stud; the upper stud effects the release of the detent lever, the lower stud receives the impulse of an inclined plane attached to the detent lever, immediately after the release of the said detent lever. The release of the detent lever also disengages the fly of the clockwork whose pinion gears with a " count wheel" that is furnished with ten studs. During the return of the pendulum, the clockwork is active, and (by means of a stud on the count wheel) brings back the detent lever to its position of rest. A hooked rod and a lever (each working from a fixed centre on the clock plate) communicate the action of the upper pendulum stud to the detent lever, so as to release it. The fly of the clockwork is disengaged by the action of a projection on the detent lever upon a counterbalanced lever whose normal position is in contact with a rod projecting from the fly axis, consequently, when the detent lever is risen by the clockwork into contact with the hook, the counterbalance lever is free to act upon the projecting rod and to stop the clockwork; the above action is then repeated during the next double oscillation of the pendulum.

[Printed, 8*d*. Drawing.]

## A.D. 1863, November 10.—N° 2788.

**HABICHT, John Conrad.**—(*A communication from Frederic Parrot and Charles Martin.*) — (*Provisional protection only.*)— "Certain improvements in keyless watches."

"This arrangement of winder is visible and does not sensibly "conceal the ordinary works of the watch; it also avoids the use "of a push piece for setting the hands."

"Through the pendant of the watch case passes an axis, the "top of which is square and is furnished with a milled knob, the "other extremity is also square and fits into the centre of the "motive pinion, which is placed in an opening made in the bridge "and plate of the watch; this pinion gears with a double-"toothed wheel properly fixed to the bridge of the winding "work; this wheel gears with another fixed on a balance lever "placed under the bridge and kept close against it by means of "a spring, this latter wheel gears with a small intermediate one "which again gears with that placed on the square of the main-"spring, and which is provided with a click and spring, and can "in consequence only move one way; if, therefore, the milled "knob is turned to the left the works are wound up, but if turned "to the right no effect is produced on them.

"The arrangement for setting the hands is as follows:—The "axis of the motive pinion is provided with a groove in which "enters one end of a small lever, the other end resting against a "rod placed in a notch in the plate and fixed to the balance "lever. Now it follows that if the axis of the motive pinion be "drawn out it must move the small lever and cause it, by means "of the before mentioned rod, to move the balance lever, and "thus cause the wheel which it carries to gear with a pinion for

" setting the hands, which may be turned to the right or left as " required."

[Printed, 4*d*. No Drawings.]

### A.D. 1863, November 13.—N° 2827.

**MARRIOTT, BENJAMIN, and RADCLIFF, CHARLES.**—" Improvements in dead-beat independent centre seconds watches."

The seconds hand is placed "on a pivot, which passes through " the centre wheel arbor made large enough for this purpose. " The arbor of this pivot carries a contrate wheel, with teeth " so placed as to pass through spaces in a cylinder (somewhat in " the manner of an escapement) at intervals, such that the " seconds hand has a dead beat. The power is taken from the " centre wheel through another wheel with a loose pinion with " a friction movement and the centre seconds hand may be " stopped while the rest of the works go by the action of a " stop, which arrests the contrate wheel, and the wheel with " the loose pinion kept together by a detent spring, while the " cylinder is still free to move."

[Printed, 8*d*. Drawing.]

### A.D. 1863, November 23.—N° 2943.

**HOWARD, CHARLES.** — " An improved watch-case pendant, " applicable also to other articles."

This invention consists of "the entire abolition of the screw " or pin which connects the bow and pendant and the substitution " of a solid bow revolving or fixed as may be required."

" A solid bow of perfect and equal strength in all its parts " is " its own unaided connection between watch and chain or guard." The inventor's pendant is formed "originally with a hole or " aperture through it sufficiently large for the introduction of a " bow of the size required. If the case be not and is not to be " secret spring, and a revolving bow be required, the operation is " completed when the bow is inserted through the pendant, " shaped and soldered. If a fixed bow is needed the bow and " pendant must both be tapped and screwed together before " being so shaped and soldered. If the operation of secret " springing is to be performed, whether revolving or fixen, the " bow must be soldered after the push pin has been adjusted to it " instead of to the screw or pin as heretofore. If the pendant

" belong to an old case and is required to be adapted to this " Patent, the present screw hole or pin hole has merely to be " enlarged to the size of the bow wire and the process completed " as before. If the old watch case has been secret spring it will " be necessary before soldering the bow to send it to the springer " for readjustment."

[Printed, 4*d.* No Drawings.]

A.D. 1863, November 28.—N° 2990.

**BEVAN, EDWARD, and WEARE, WILLIAM SYDNEY.**—" Improvements in and applicable to watches to obtain or produce " independent centre seconds."

The requisite motion is obtained for the centre seconds hand from the "fourth wheel." The independent centre seconds mechanism consists principally of three wheels, "the first and " second intermediate wheels," and the "seconds' wheel." "The " motion of the first intermediate wheel is communicated to the " second intermediate wheel by frictional contact;" "a small " spring" is fitted "say, on the outer and preferably concave " formed side of the second intermediate wheel, placing over the " said spring a cap, which, when in working position, comes up " to or in contact with the intermediate arbor cock. To stop the " centre seconds a push, draw, slide, or screw piece is fitted into " and through the pendant or other convenient part of the watch " or timekeepers to convey pressure by a spring or otherwise, " say, to the side of the 'seconds' wheel.' Thus it will be seen " that when the centre seconds hand is stopped the 'seconds' " wheel' and second intermediate wheel are also stopped, but " the first intermediate wheel continues in motion."

In one arrangement shown in the drawings, the said small spring is "on the outer side of the second intermediate wheel," and, in another arrangement, "a spiral spring is placed between " the intermediate wheels." In a plan for stopping permanently the independent centre seconds without continuous pressure on the push piece, a star wheel and spring pin are used in connection with the bent spring of the push piece.

[Printed, 8*d.* Drawing.]

A.D. 1863, December 5.—N° 3055.

**VARLEY, SAMUEL ALFRED, and VARLEY, CROMWELL *FLEETWOOD*.**— *(Provisional protection only.)*—" Improvements

" in heating, parts of the invention being applicable to other " purposes."

" An important application of this invention is to astronomical " clocks to keep the pendulum and pivots of the clock at one " uniform temperature."

The invention is based upon that set forth in No. 2858 (A.D. 1860), and it consists in heating by gas to a uniform temperature, " in removing the deleterious effects of gas, in the construction " of the self-acting thermometric valve," " and in the form of gas " burner."

The boiler consists of two or more water casings placed within each other. The gas furnace is inside the boiler, and the water casings are connected together. The products of combustion pass up and down between the casings, and then out. " The " 'up' cast hot water pipe is attached to the top of the casings, " and the 'down' cast near to the bottom of them." The pipe supplying the air, and the pipe that carries off the products of combustion are carried outside the building.

In the " regulator " the spirit and mercury are prevented from mixing during carriage, either by connecting the two through a small aperture, or by inserting a film of vulcanized india-rubber between the mercury and spirit. A plunger determines the temperature at which the gas is cut off, and an index shows this temperature. The heat of the room forces up the mercury, and cuts off the gas.

The gas furnace consists of a cylinder or cone of two or more layers of perforated metal. Over the small jet by which the gas is lighted a piece of spongy platinum is placed to re-light the said jet in case it should accidentally go out.

[Printed, 4*d*. No Drawings.]

## A.D. 1863, December 16.—N° 3177.

GOUVERNON, JULES.—(*Provisional protection not allowed.*)— " Improvements in watches."

The following are some of the features of this invention :—

" The T-shaped bridges are of one piece, and are all set to the " plates on the same level, which arrangement permits of the " same height being given to the remontoirs of the various " movements."

"The solidity of the double wheel and of the remontoir ratch" is ensured by the disposition of a screw and a ring.

Instead of the cap on the bridge of the barrel, a steel cock under the plate keeps the arbor firm.

The ratchet wheel which supports the crown wheel "is tightened " by a steel screw, the thread of which is cut in the opposite " direction to that on the arbor of the barrel at the upper side of " the crown wheel. By this arrangement the screw cannot be " unfastened when the crown wheel is moved to set the hands."

"With regard to the adjustment of the spring and click work," " the notch of the click adjusts itself to the notch of the spring. " A screw, the head of which rests on the crown wheel, passes " through the click and engages in the spring." "Another " screw in the other side, fixed like the first one, insures the " solidity of the spring as well as of the click."

The teeth of the remontoir wheels are strengthened "at their " base."

The inventor has "so disposed the bridges as to give every " facility for the proper fixing of the remontoir works."

[Printed, 4*d*. No Drawings.]

## 1864.

A.D. 1864, January 21.—N° 169. (* *)

**RITCHIE, FREDERICK JAMES.**—"Improvements in the appli" cation of magneto-electricity to the propelling and controlling " of sympathetic clocks."

The alternate currents or shocks from a magneto-electric machine are changed into currents of one kind by a "current " changer" on the axis of the revolving armature. Attached to the framework of the normal clock, and worked by the teeth of the escape wheel, is also a "current changer," which passes "an " alternate stream of positive and negative currents, continuing " very nearly an entire second of time," to the electro-magnets of the sympathetic clocks. By this means permanent magnets are made to oscillate in the sympathetic clocks, and thus to impel their wheelwork at regulated intervals of time.

In large sized clocks, the wheelwork is propelled "in the ordi-" nary manner by means of a main spring or weights wound up " at intervals," but, instead of using a pendulum, the escapement is unlocked by means of the vibratory motion of the magnets.

In the magneto-electric machine, two out of the four bobbins employed are placed upon each pole, and a soft iron armature revolves before the poles.

The clockwork operating the magneto-electric machine is liberated at suitable intervals by means of a "Denison's gravity " escapement."

In the current changers flat conducting springs are employed in connection either with cams or with the teeth of the escape wheel.

[Printed, 1*s*. Drawing.]

### A.D. 1864, March 8.—N° 570.

**LAEDERICH,** CHARLES EUGÈNE. — " Improvements in " watches."

This invention relates to certain modifications in the keyless watches described in No. 1339 (A.D. 1863).

"The ratches hitherto made use of in remontoir watches," are put aside in the said certain modifications. "The distinguishing " feature" of this invention is "allowing to pass directly from " the winding up to the setting of the hands" by means of the pendant axis, carrying a pinion or pinions "for performing alter-" nately one or the other of the said operations."

In one modification, the pendant axis slides in a guide piece attached to the pillar plate, and carries, at its extremity, a pinion which, when the pendant axis is pulled out, gears with the winding mechanism, and when the said axis is pushed in, gears with the minute wheel which is not on the central axis of the watch, but gears therewith.

In another modification, "the parts for the winding up of the " watch" are "situated on one side of the pillar plate," "and " those for the setting of the hands on the opposite side of the " side plate."

In a third modification, the minute wheel is situated in the centre of the pillar plate.

In a fourth modification, two pinions on the pendant axis are used. These pinions have a cylindrical part between them; one is capable of gearing with the winding up apparatus, the other with that for setting the hands. By pressing on a stud, the end pinion is placed in gear with the minute wheel.

[Printed, 10*d*. Drawings.]

### A.D. 1864, March 18.—N° 692.

**GENEVRIER, JOSEPH, and BIDAUX, PIERRE EUGÈNE.**—"Improvements in spring barrels for clocks and alarums."

The objects of this invention are:—1. To avoid the daily winding up and setting. 2. To adapt to alarum clocks certain hands and striking apparatus, at the same time requiring no special setting or winding. 3. To signal the opening of doors, boxes, or safes.

The following arrangement is adopted for alarum clocks:—"On "the arbor of the spring barrel a cog wheel is mounted, which is "held at rest by the pin of a detent catching in a notch or "groove made in a ring screwed on to the cog wheel itself; when "this pin is set free," "the cog wheel turns and transmits move-"ment to the hammer of the alarum; after it has completed one "revolution, the pin again holds it as before."

In regard to the spring barrels of door alarums, the alarum being fixed to the wall, the end of a cord (connected with a pulley on the barrel axis) is attached to the door. The opening of the door unwinds the spring, and thus communicates motion to gear work which actuates the hammer of the bell. A slightly different arrangement is set forth in the Provisional Specification.

The Final Specification and drawings describe and show the two following arrangements:—1. A striking clock that serves as an alarum, in which the two pins necessary to start the detent of the bell are placed on a disc fixed to the minute-wheel axis. 2. "An alarum clock with day of the month hand," in which the said cog wheel of the alarum, and its accompanying parts are placed above the pallet plate.

[Printed, 8*d*. Drawing.]

### A.D. 1864, April 16.—N° 967.

**EHRHARDT, WILLIAM.**—"Improvements in keyless watches."

This invention consists of certain improvements in "watches in "which the winding up of the watch and the setting of the "fingers are effected by turning a milled head on the pendant of "*the watch*."

To wind up the watch, a toothed wheel, on the axis of the milled head, gives motion to certain spur wheels connected with the fusee arbor. A hollow toothed wheel on the fusee axis communicates motion to that axis (when the milled head is turned in the direction necessary for that purpose) by means of a friction plate, a spring, and a ratchet wheel. When the milled head is turned "in a direction contrary to that proper to wind up the "watch," there is no action on the winding up mechanism. Instead of a single spring, two springs may be used in the hollow toothed wheel.

To set the hands, "a pinion situated on a slide, is made to "engage with the toothed wheel actuated by the milled head." "When the slide is pressed inwards, by acting on its end at the "edge of the watch, the pinion it carries is made to engage with "the minute wheel, and the inner end of the slide at the same "time throws the spring pall out of gear with the friction plate. "The milled head now acts on the fingers, the hollow toothed "wheel and friction plate turning freely in either direction "without acting on the ratchet wheel on the axis of the fusee. "When the end of the slide is no longer pressed it resumes its "normal position and the turning of the milled head acts only "on the winding mechanism."

[Printed, 6*d*. Drawing.]

### A.D. 1864, June 9.—N° 1436.

HENRY, Michael.—(*A communication from Henry Giroud.*)—"Improvements in gas regulators, also in gauges and clocks."

Several arrangements and modifications of gas regulators, together with valves and other appliances, are described and shown. A pressure gauge is also set forth.

For measuring time, illuminating gas, regulated by means of "the gas of consumption," "is conveyed through an ordinary "dry or wet gas meter, and caused to flow in such manner that "the wheel of the meter shall transmit motion to the minute "wheel and pointers or hands of a clock face. The meter "rests on a float set in a vessel filled with water, and if the wheel "be sufficiently immersed, and the pressure of the gas to the "burners regulated according to the size of the jets or orifices, a "continuous flow will be obtained and a perfectly regular motion "will be transmitted to the hands. Thus, supposing the expenditure of gas and the hour known, the quantity of gas expended

" may be calculated per minute or other interval of time. These " clocks may be attached to gas lamps or chandeliers in churches " or elsewhere, and may be illuminated by the gas which acts as " the motive, or driving and maintaining power of the clock. " Instead of gas, which is sometimes not available to work the " clock, as, for example, in daylight when not turned on, air " under pressure may be used instead, or air and gas alternately, " the same being turned on and off as required by using a two- " way cock."

[Printed, 8*d*. Drawing.]

### A.D. 1864, June 15.—N° 1487.

**GONDELFINGER, George, and BICHET, Jean Louis.**— " A mechanism of remontoir in pendant applicable to all watches " with an anchor and cylinder."

This invention relates to winding up a watch, and setting the hands thereof, by means of a spindle that passes through the pendant, and is capable of longitudinal and rotary motion therein. At the upper and external end of the said spindle is a knob which forms the means of putting it (the spindle) in motion; at the lower extremity of the spindle is a wheel having two kinds of teeth. The upper and angular teeth of the wheel are formed like those of a Bréguet's key, the lower teeth like the pins of a pin wheel. When the spindle is pulled upwards and secured by a bolt in that position, the angular teeth engage with a wheel in gear with the winding mechanism; when the bolt is pulled back and the spindle depressed, the pin teeth gear with the wheels on the central axis of the watch.

In a modification of the above arrangement, the spindle has no movement in the direction of its axis, but only has a movement of rotation; the above-mentioned double-toothed wheel slides upon the spindle, and is usually in gear with the wind-up mechanism, but may be placed in gear with the central axis by means of a spring push pin.

A click and spring prevent the barrel from being over-wound.

The old stop work fitted beneath the barrel is made visible by being placed " above the wheel."

In the above-described modification, stop-work may be dispensed with.

*[Printed, 10d. Drawings.]*

### A.D. 1864, July 6.—N° 1677.

**TUNKS, David.**—(*Provisional protection only.*)—" Improve-" ments in watches or other time-pieces for indicating whether " they require to be wound-up or not."

A pinion is fixed on the shaft of the fusee of a watch and geared into a wheel, to the shaft of which a finger or pointer is fixed; on the face of the watch is "an indicator formed of a " segment of a circle corresponding with the outer end of the " finger or pointer, and marked at one extremity 'up,' and at " the other extremity 'down.' The pinion moves with the fusee, " and turns the wheel, and also the said finger or pointer, and " when the watch is down or unwound, the finger points to the " word 'down' on the segment, and when the watch is being " wound up the movement of the pinion is reversed, and gives " reverse motion to the wheel and finger until the latter points to " the word 'up' on the segment. As the watch works the finger " proceeds again to the word 'down,' and thus the condition of " the watch, whether it requires to be wound up or not, can be " detected by the position of the finger on the segment.

" Or instead of fixing the pinion on the shaft of the fusee," it may be fixed " on any other revolving shaft of the watch or time-" piece which may be found convenient," and its motion may be transmitted "to the finger or pointer by one or more wheels," in order that the indicating segment may be placed " either on the " ordinary dial or on any other part of the watch or timepiece."

[Printed, 4*d*. No Drawings.]

### A.D. 1864, July 23.—N° 1840. (* *)

**LE BOULENGÉ, Paulus Æmilius.**—" An electro-balistic " chronographe."

" This invention consists in an electric chronographe for mea-" suring short spaces of time with great accuracy, and especially " for denoting the time a projectile takes to pass through a " portion of its trajection."

On a fixed vertical frame, two electro-magnets are fastened at different heights. To the upper one, during the passage of an electric current through its coils, a " time measurer " is suspended; to the lower one a " weight." The " time measurer " is a hollow metallic cylinder, having at the top a steel plug; two paper tubes are placed respectively on the upper and lower portions of the cylinder. When a "disconnector" breaks the separate currents of the two electro-magnets simultaneously, the weight, in its fall, actuates a trigger and knife, and cuts a mark on the lower paper tube during the fall of the "time measurer;" there is thus obtained a certain height (H), which corresponds to a certain time (T). When the said separate currents are broken by the traversing of two frames (one to each current) by a projectile, so that the fall of the "time measurer" precedes that of the weight, the upper paper tube is marked by the knife; there is thus obtained a second height ($H^1$) of the fall, corresponding with a time ($T^1$). Then $T^1 - T$ is "exactly the measure of the time" which the projectile has taken to pass from one frame to the other, and, if this distance be called E, $\frac{E}{T^1 - T}$ = the speed of the projectile between the frames.

Inverse currents (one to each electro-magnet), which always exist, reverse the poles of the respective electro-magnets, "at the " instant of the rupture of the direct circuit."

When the indication is obtained by the induction spark, a "time measurer" and a frame holding two points are only required; this apparatus "is applicable to the measure of velocity " in the barrel of a fire-arm."

[Printed, 10*d.* Drawings.]

### A.D. 1864, August 26.—N° 2107.

MULLER, MARKS LEOPOLD.—"Improvements in watches."

"My invention of improvements in watches relates to arrange- " ments for obtaining dead beat independent seconds. These " arrangements consist of an additional wheel with a pinion, so " placed as to be driven from the third wheel of the watch; a " pressure spring, spring clawker, spring detent, or like contri- " vance works into the teeth of the additional wheel and regulates " its motion, so as to produce the division for obtaining dead beat " seconds. I drive the seconds hand from the additional wheel " by mounting the seconds hand on an axis provided with a " toothed disc, plate, wheel, boss, or clutch, which engages a " corresponding toothed disc, plate, wheel, boss, or clutch on the " axis of the additional wheel, so that when I wish to stop the " seconds hand I do not disconnect the additional wheel from the " going part of the watch, but I disconnect or disengage the " seconds hand from the additional wheel by disengaging one of

" the toothed discs, plates, bosses, wheels, or clutches from the " other by means of a push-piece or slide, or other convenient " contrivance."

[Printed, 8*d*. Drawing.]

### A.D. 1864, September 27.—N° 2362. (* *)

CLARK, WILLIAM.—(*A communication from Anatole Jean Baptiste Lesieur and Pierre Désiré Prud'-homme.*)—" Improvements in " the means of actuating electric dials or clocks."

Instead of the wheel mechanism being acted upon directly by the armature of an electro-magnet, as in ordinary electro-magnetic clocks, the motion of the pendulum is regulated by an electro-magnet, and communicates motion to the wheel mechanism of the clock.

A soft iron armature is fixed at the lower end of a pendulum that oscillates in half a second, and is attracted whenever it arrives at the extremity of its arc of oscillation in one direction—every second of time—by an electro-magnet at the extremity of that arc, and which becomes active every second; the regularity of the oscillations of the pendulum is thus provided for. It is to be remarked that the electro-magnet is vertical, and that its upper horizontal surface or pole is placed at such a distance from the horizontal surface of the armature as to permit of the pendulum oscillating freely witnout striking the said horizontal surface or pole of the electro-magnet.

The projecting tooth of a lever that is fixed to the pendulum, near its upper end, rotates a ratchet wheel one tooth " for every " double oscillation of the pendulum." The outer end of the lever rests on a fixed steel point, and has a notch to allow of the said lever " being depressed in a given time in order to advance " the ratchet " " one tooth only, said ratchet communicating " motion to the wheel mechanism."

By the above arrangement, synchronism may be obtained in the movements of all the clocks in a town.

This method " is also applicable to a balance wheel arrangement " furnished with a spiral spring."

[Printed, 8*d*. Drawings.]

### A.D. 1864, October 18.—N° 2575.

NEWTON, WILLIAM EDWARD.—(*A communication from Henry Rothfelder.*)—(*Provisional protection only.*)—" Improvements in " chronometer watches."

1st. "The employment of a secondary or assistant lever to the "locking lever of chronometer escapements;" also "the con-"construction and arrangement of the locking lever and the "assistant lever with the lifting pallet and escape wheel."

2nd. "Constructing the compensation balance with one circular "uniform rim, to the inside diameter of which semicircular com-"pensating bars are attached, operating the balance weights "arranged on the exterior diameter of the rim."

3rd. "The construction and arrangement of parts constituting "the connection of the main spring to the main gear when made "to wind from left to right, and arranged with a self-acting and "maintaining click while dispensing with the fusee and chain "entirely. The maintaining click wheel rests close upon the "main gear and is connected to it by a circular spring placed in "a recess in the upper side of the main gear; one end of the "spring is secured to the maintaining click wheel, and the other "end has a stud resting against the end of a slot formed in the "main gear." "A large hub secured to the fusee arbor is pro-"vided with a hook, which takes hold of the inner end of the "main spring, the outer end of it being secured to the spring case "which is stationary, and secured to the upper plate of the "movement."

[Printed, 4*d*. No Drawings.]

### A.D. 1864, December 6.—N° 3033.

GEDGE, WILLIAM EDWARD.—(*A communication from Emile Marie Girard.*)—(*Provisional protection only.*)—"Improvements "in clockwork."

"This invention consists in the entire suppression of the pivots "of the escapement axle or arbor in clockwork having a long and "heavy pendulum, and of the escapement arbor itself as well as "the fork. These pivots indispensable hitherto, are replaced by "two spring blades, precisely similar to those used to suspend the "long and heavy pendulum in ordinary clocks, but which have "not hitherto been used without the escapement arbor and its "pivots. This invention not only suppresses the pivots, arbors, "and forks, but it also prevents all the frictions they produce, "dispenses with the use of oils in this part of a clock, and con-"sequently the wear and tear of these same parts is done away "*with*."

[*Printed*, 4*d*. No Drawings.]

## A.D. 1864, December 13.—N° 3088.

**NEWTON, ALFRED VINCENT.**—(*A communication from Theodore Ruggles Timby.*)—"Certain improvements in solar timepieces."

"The object of this invention is to arrange a terrestrial globe " or planisphere in such relation to a dial plate and index that " the culminating time of the sun, and consequently the true " solar time, and also the clock or mean time, and the difference " of time in different localities of the globe, can be observed " simultaneously at any moment, The globe or map is sur-" rounded by a ring or dial and revolved with the same once in " twenty-four hours under a stationary index in such a manner " that the index will point to the local time of any place on the " globe or map for which the dial may be adjusted, and at the " same time the difference of time in different localities on the " globe, and the solar time as well as the clock time can be " observed. A second dial revolving once every hour, and pro-" vided with sixty marks indicating the minutes, is combined " with a stationary index and with the globe or map and hour " dial in such a manner that while the main dial with its index " gives the hours, by the secondary dial the minutes are indicated, " and a clock is obtained which gives an accurate account of the " time."

The rotation of the globe and graduated dials may be effected by means of spur gear to which motion is imparted "by a clock " movement or in any other desirable manner."

[Printed, 8*d*. Drawing.]

## A.D. 1864, December 14.—N° 3100.

**TONGUE, JOHN GARRETT.**—(*A communication from Charles Lehmann.*)—"Improvements in the construction of watches or " other similar timekeepers."

This invention relates to winding up the said timekeepers, and setting the hands of the same by means of a rod passing through the pendant. The pendant axis has a milled head at its upper end; inside the watch it is enlarged, and has a spring clutch mounted thereon, part of which is in connection with a screw, " which gives movement to the axis of the barrel by means of an " intermediate toothed wheel. The worm is held by a fixed arm, " so that it can only revolve in one direction. The end of the " bar or rod which passes through the worm carries a small

" toothed pinion, which transmits motion to a train of wheels for " actuating the minute hand. By turning the milled button in " one direction the worm is set in motion to wind up the watch, " but when turned in the opposite direction the teeth of the " spring clutch upon the winding up bar or rod, escape over each " other in a similar manner to that of the 'Breguet' key, at the " same time the small pinion is disengaged, and the mechanism " of the minute hand cannot suffer any derangement. But when " the winding up bar or rod is pulled outwards, and is retained in " that position by the spring stop, the toothed pinion will then " be in gear with the train of wheels for setting the hands, the " winding up mechanism being stationary or thrown out of action " until the winding up bar or rod is pushed back into its former " position."

[Printed, 8*d*. Drawing.]

## A.D. 1864, December 21.—Nº 3169.

**HENRY, MICHAEL.**—(*A communication from Léon Foucault.*)— " Improvements in governors."

Three governors for clockwork and instruments of precision are described; in these instruments "velocity is regulated by " absorption of motive power." The first is "a spring governor " having vanes working in the air." The second is "rendered " isochronous by the combination of a counterbalance weight " and a weighted ring," and has " vanes which work in the " air." The third is "a spring governor, in which the absorbing " work is produced by rubbing pieces, the pressure of which " against the surface whereon friction is exerted being graduated " by springs."

This invention mainly consists in improvements on the invention set forth in No. 3479 (A.D. 1862), and it refers to isochronous centrifugal governors. The condition of isochronism is " that " the work of all the weights and counterbalance weights shall " be in proportion to the square of the travel of the ring or collar " reckoned from the point of suspension.";

In respect to the above governors for clockwork, the first is characterised by the point of suspension and the place occupied by the ring being interchanged; vanes take the place of balls, and these are drawn towards the axis by helical springs, the ring acting upon another vertical spring through a lever. In the second, forked vanes diverging upwards are connected to a weighted ring, and (by means of jointed connecting rods) to a suspending piece; the ring is also connected by levers to a counterbalance weight. In the third governor, friction pieces act on the interior of a friction ring, only when the divergence of the balls disturbs the equilibrium of two sets of springs.

[Printed, 2*s*. 4*d*. Drawings.]

## 1865.

### A.D. 1865, January 6.—N° 53.

**REYMOND, George.**—" Improvements in the construction of " escapements for watches and other timekeepers."

" This invention has for its object the so constructing the " escapements of watches and other timekeepers in which balance " or swing wheels are employed as to render the overturning of " the balance impossible. For this purpose the impelling pallet " which receives the impulse from the teeth of the escapement " wheel is carried on the axis of the balance or swing wheel, as " is usual; the unlocking or discharging pallet is not carried on " this axis, but a pinion on the axis gives motion to a second and " larger pinion, which is by preference formed with three times as " many teeth as the pinion on the axis of the balance or swing " wheel. The unlocking or discharging pallet is either carried on " the axis of this larger pinion, or motion is transmitted to it " from this pinion. By this means the balance wheel must make " three complete revolutions before it can trip or overturn."

[Printed, 10*d*. Drawings.]

### A.D. 1865, January 19.—N° 157.

**ABEL, Charles Denton.**—(*A communication from Eugéne Deroche.*)—" Improvements in the construction of watches."

" These improvements have reference to mechanism for winding " up and setting watches without a key."

A spindle that passes through the pendant is capable of sliding and rotating. At its outer extremity the spindle carries a knob, at its inner extremity a compound pinion consisting of a spur pinion and a crown pinion. The spur pinion is in gear with wheelwork communicating with the arbor of the fusee; when the spindle is turned, this pinion, therefore effects the winding up of the watch. The crown pinion can, by pressing the spindle inwards, be put in gear with one of the minute wheels; the spur pinion is then out of gear with the winding up movement, and, by turning the spindle whilst it is thus pressed inwards, the setting of the hands forward or backward, may be effected.

Inside the watch, the pendant spindle "is of an enlarged cylin-" drical form, and fits into a corresponding cylindrical cavity." The normal position of the pendant spindle is that in which the spur pinion is in gear with the winding up movement. By depressing a stud, on the rim of the watch, connected with a spring, the spindle is moved into the position for setting the watch, a circular groove being formed in the said spindle for the spring to act in. "The spindle with the pinions is readily accessible by " simply removing the bracket from the pallet plate, and the " other parts of the movement before described are all visible."

[Printed, 6*d*. Drawing.]

A.D. 1865, February 3.—N° 298. (* *)

VALE, William.—"Improvements in the manufacture of pencil " cases."

The object of this invention is to combine a watch key with an ever-pointed pencil case. To the base of the reservoir for containing leads is fixed a plug which screws into the barrel of the case; a continuation of the plug (drilled with a square hole) constitutes the barrel of the key. In order that the key may fit any size of watch the barrel is slit lengthways and formed externally " of a bulged or conical shape;" a cap, having an internal flange and screwed on to a portion of the plug, bears upon the cone and so regulates the size of the hole. If the case be of ivory or bone, the plug is screwed into the upper portion and secured there by a pin. The pencil cases may be furnished with a knife at one end and a pen at the other.

[Printed, 8*d*. Drawing.]

A.D. 1865, February 18.—N° 462.

BIDAUX, Pierre Eugène.—(*A communication from Joseph Générier.*)—"*Improvements* in the application to clocks and "alarms of a circular escapement in place of the ordinary balance "wheel."

This invention "consists in substituting a circular escapement "for the ordinary balance wheel, the advantage of which is that "it obviates the necessity of maintaining the timepiece always in "a vertical position."

In one arrangement, the balance wheel is furnished with a pin which butts against the lever of a fork mounted on the axle of the anchor piece; the fork "acts as a compensator." By means of the fork and the pin, each tooth of the wheel that acts on the anchor piece "produces a movement of the balance wheel."

In another arrangement, the anchor piece is furnished with either two or four teeth, and the balance wheel completes "one "entire revolution before making the return stroke, the result of "which is that greater power is given to the movement" as well as to the balance spring. "A single elbow piece" is substituted for the "fork" mentioned in the first arrangement; the object of the arm of the said elbow piece "being bent is that in each "course of the pin" "from right to left, or vice versa, the pin is "pressed longer by the arm, thus forming an inclined plane in "one sense or other, so as to prevent too sudden a shock, and "at the same time give greater power to the balance wheel."

The bridge that supports the lower pivot of the balance wheel may be dispensed with, and the balance-wheel axis may be allowed to rest on the pallet plate.

[Printed, 10*d*. Drawings.]

### A.D. 1865, March 15.—N° 726.

CHEVOB, Henry.—"Improvements in keyless watches."

This invention "consists in actuating the winding square by "means of the handle or bow of the watch. Keyless watches "are wound from the top by means of certain mechanical arrange"ments actuated by a knob in the shape of a crown or some other "device instead of by a special watch key.

"The object of this invention is to simplify the means of "winding the watch by performing the same object with less "mechanical arrangement. The key handle, which forms the "winding power, is made in one piece, and the watch can be "repaired by any ordinary workman by simply unscrewing the "handle from the top of the pendant and taking out the move-

"ment. This winder is a substitute for a regular briguet" [Bréguet?] "key, and can be handled by the most unskilful "workman as well as by the most delicate lady without the least "trouble. With the crown system at present in use it requires "nearly double the time to arrive at the top of the clickwork." With this invention "the strength of a key shaped to wind up "any hard spring is far superior to a crown, which offers but "little hold to the fingers. This winder ensures the greatest "solidity by being fixed on the square winder with a screw perforating it entirely, whereas the old system only allowed its "being slightly screwed on the sides. Should the watch require "to be repaired the movement can be taken out of the case by "removing in one minute the screw fixing the key, and this "without interfering at all with the bow."

[Printed, 8*d*. Drawing.]

### A.D. 1865, March 17.—Nº 744.

**STANDFIELD, John.**—(*Provisional protection only.*)—"Im"provements in differential wheel gearing."

"This improved differential gear is suitable for clockwork."

The said gear consists of four spur wheels, "*a*, *b*, *c*, & *d*, and "of a driving wheel or disc *e*, and the principal feature in my "gear is that one of the spur wheels is fixed and not revolving. "The wheels *a*, *d*, and *e* are placed on the shaft to which the apparatus to be driven is secured; *a* is loose on the shaft, but "secured to the framing or pedestal; *d* is keyed to the shaft, "and *e*, placed between *a* & *d*, revolves loose on the shaft. "Through a boss formed in the wheel or disc *e* passes a short "arbor turning loosely in the boss; to one end of this arbor is "keyed the wheel *b* gearing into *a*, and to the other end of the "arbor is keyed the wheel *c* gearing into *d*. Supposing the "wheels *a* and *c* to be of the same diameter, and twice as large "as the wheels *b* & *d*, it follows that when the wheel *e* has performed one revolution, the wheels *b* & *c* will have passed once "round the stationary wheel *a* and wheel *d* respectively whilst "the shaft with its appendages will have performed three "revolutions."

"The driving wheel *e* may be a groove pulley, a strap pulley, "or it may be a toothed wheel driven through a wheel or pinion, "or it may have a handle fixed to it, and be driven by hand, or

" when applied to a capstan it may be turned round by levers. " Instead of toothed wheels the grooved frictional wheels or " pulleys may be employed."

This "improved differential gear and its modifications are " applicable to a variety of purposes."

[Printed, 4*d*. No Drawings.]

### A.D. 1865, April 10.—N° 1018.

**BROOMAN, Richard Archibald.**—(*A communication from Cesar Auguste Deverte.*) — " An improved method of forming " tapered rods and bits."

This invention relates to rods that are employed in clockwork, " and to rods used for other purposes."

The tapering of the said rods is accomplished " by means of the " biting action of a chemical bath instead of by grinding or filing " as heretofore."

The drawings show rods of various cross sections, but, for clockwork, rods with five faces are preferred. The end of the rod that is to be tapered is sharpened by grinding or filing. Several of the rods are then fastened together by wire and tempered, submitted to the action of a solution of caustic potash, and washed with water; they are then scoured with dilute hydrochloric acid, again washed, and placed in plates pierced with holes to receive them. Thus mounted, all the rods are dipped " in a " biting bath by a continual downward and upward movement " communicated to the plates in which the rods are held." When the rods have been submitted to the action of the bath for a sufficient time, and thereby become tapered, they are plunged " in a solution of whiting to remove the acid, and preserve the " steel rods from oxidation."

[Printed, 8*d*. Drawing.]

### A.D. 1865, April 11.—N° 1033.

**PHILLIPS, Lawrence Barnett.** — (*Provisional protection only.*)—" Improvements in watches."

This invention is more particularly applicable in making " key- " less watches." " By the present improvements not only may " a comparatively thin watch be made when using full plates " with keyless movements, but greater strength may be obtained " with the use of a less number of parts.

"According to this invention the top plate is made thicker "than usual, so as to admit of being recessed or have 'sinks' "made therein, so that the balance may work in a 'sink' or "recess in the top plate, and by preference the barrel also may "work in another recess in the under surface of the top plate. "The pillar plate is made solid, with 'sinks' or recesses for "receiving the wheels, keyless mechanism, and escapement. The "'potance' which receives the lower end of the arbor or staff of "the balance is dispensed with, and in place thereof such staff "or arbor is received into the pillar plate, and a cock on the "upper surface of the top plate."

[Printed, 4*d*. No Drawings.]

A.D. 1865, May 2.—N° 1230.

**SIEMENS, Charles William.**—"Improvements in the means "and apparatus for regulating the power and velocity of "machinery or apparatus in motion."

This invention "has for its object to accomplish the functions "of the free conical pendulum" (see No. 10,151—A.D. 1844), by a simple arrangement, which is capable of being employed "to "regulate the speed of ordinary clockwork without the intervention of differential motion, taking the place of the flys or "pendulums usually employed for such purpose."

This apparatus is called a "liquid chronometer;" "it consists "of a cup or shell, open at top and bottom, rotating on its "vertical axis, which dipping into a bath of liquid imparts "centrifugal motion to the portion of the liquid inside the cup, "causing the liquid so impelled to rise until it is on the point of "overflowing. The liquid is maintained in this condition without further expenditure of power, so long as the speed or power "of the machine or apparatus to be regulated remains at the "normal standard; so soon as this is exceeded, and a consequent increased impulse is imparted to the cup, the liquid "overflows the upper edge of the rotating cup, causing expenditure of power, which will prevent the further acceleration of "the cup, and this absorption of power may be further increased "by causing the liquid thrown out to pass alternately against a "series of fixed radial vanes, and vanes rotating with the cup."

In clocks, the cup-shaped vessel is paraboloidal; its central *boss (supported* by ribs) is screwed, and is therefore capable of rising and falling on its central spindle. Rotation is given to the cup by means of a spiral spring connected to the upper end of the spindle.

Applications of the invention to steam engines and telegraphic apparatus are described in detail.

[Printed, 1*s.* 6*d.* Drawings.]

### A.D. 1865, May 23.—N° 1415.

**ADLER, Herman.**—(*Provisional protection only.*)—" Improve-" ments in clocks and timepieces."

1st. "The combination of mechanism whereby the seconds " circle and seconds hand form the end or point of and move " round the face of the clock with the hour hand." " On the end " of the hour hand is placed a circular piece of metal, round the " border of which are marked the seconds in the same way as on " watches. This hour hand is hollow; motion is communicated " to the seconds hand by means of a rod " which passes " through " the hollow hour hand; one end of this rod works in a pinion " on the arbor, the other end working on a very minute pinion " wheel on the metal circle, which communicates motion to the " seconds hand."

2nd. " Making the clock case itself oscillate and dispensing " with the use of a pendulum." To effect this object the balance wheel and spring used in lever watches are introduced; " one " extremity of the spring is attached to the axis of the balance " wheel, and the other to a convenient part of the case; the " balance wheel thus connected with a spiral spring performs all " vibrations like a pendulum."

3rd. Dispensing with the use of a key. From the standard or pedestal of the clock "the winding power is communicated by " means of a screw working in a socket, by which motion is com-" municated to the winding square which is at the top of the " back of the clock," so that when the clock or timepiece requires winding it is only necessary " to turn the standard or a button, " or some similar contrivance, should the clock be on a bracket " or pedestal."

[Printed, 4*d.* No Drawings.]

### A.D. 1865, May 29.—N° 1470.

**SON, Henri.**—" Improvements in the construction of keyless " watches."

The mechanism of the watch is contained in a spherical case, which is divided into two parts, the upper part being fixed by screws to a crown wheel which gears with a wheel loose on the barrel axis. Under the latter wheel there is a ratchet wheel fixed on the arbor of the barrel, into the teeth of which ratchet wheel a click fixed on the loose wheel takes. A small ratchet wheel, immediately below the above-mentioned ratchet wheel, serves to set the hands, its click being fixed under the loose wheel. "The " toothed wheel on the barrel" communicates motion to the cannon pinion, thence to the hands by means of other pinions. The glass is fixed in the moveable part of the case, and admits of the hands and dial being " clearly seen when required."

"To wind up the barrel the lower part of the case is firmly held " whilst the upper part of the case attached to the crown wheel " is being turned."

To set the hands an external stud is pressed inwards, and the upper part of the case is turned round until the setting is completed. The pressure on the stud carries a pinion that is mounted on a lever towards the loose wheel and the cannon pinion, so as to convey the motion of the loose wheel to the hands of the watch. The above-described click and ratchet wheel arrangement under the loose wheel provides for the distinct operations of winding and setting the hands and separates them.

The drawings show the watch attached to a bracelet as a pendant.

[Printed, 1*s*. Drawings.]

### A.D. 1865, June 2.—N° 1518. (* *)

**BROOMAN, Richard Archibald.**—(*A communication from Jean Theodore Scholte.*) — "Improvements in electro-magnetic " clocks and other timekeepers."

In this invention, "the electric current only exerts its action " when the pendulum is reduced to a fixed minimum of oscil- " lation."

To obtain the impulse at the moment of the minimum of amplitude, certain mechanism is arranged at the extremity of the pendulum. On suitably-fixed columns a double lever is arranged, the centre column supporting the said lever; one of the outside columns acts as a stop, the other to make electric contact and thus to actuate an electro-magnet. Under ordinary circumstances *the single tail of* the double levers is kept in contact with the stop by means of a helical spring, but, when the amplitudes of oscillation of the pendulum have diminished so far that a readily-movable pin, on the extremity of the said pendulum, is prevented from sliding over certain notches at the extremity of the upper part of the active arm of the double lever, the said active arm is depressed, and the electric circuit thus established enables the electro-magnet to act upon an armature at the extremity of the pendulum, and thus to ensure the continuance of its oscillations.

To communicate these independent oscillations of the pendulum to the clockwork, certain mechanism at the upper part of the pendulum is employed. At each oscillation the displacement of a lever acts upon an arm and a spring, and thus causes the advance of one tooth of a wheel. An endless screw, on the axis of the said wheel, gears into another wheel, which completes one revolution per hour.

For ordinary timekeepers, spring contacts are arranged at the extremity of the pendulum, or at a less height.

[Printed, 1*s*. Drawings.]

A.D. 1865, June 16.—N° 1630.

BROOMAN, Richard Archibald. — (*A communication from Felix Benoni Bouscatié.*)—" Improvements in watches and other " timekeepers."

"This invention relates chiefly to watches and other timekeepers " with the balance visible in an opening formed in the dial plate. " The improvements consist, 1st, in placing the pinion of the " scape wheel above instead of below, as in the ordinary arrange- " ment; 2nd, in a new kind of supporting disc of the balance " and of the escapement, allowing the escapement of the scape " wheel to advance or recede more or less, as required, for regu- " lating the watch; it is on this supporting disc that the visible " bridge is fixed on which the arbor of the balance and of the " escapement is pivoted; 3rd, in a new arrangement of regulator; " this piece carries two pins, which serve to regulate the hair " spring; they traverse the bridge and the plate, which are pierced " for the purpose to allow the pins to take the hair spring placed " under the balance; a small screw is placed at each side to act " as a stop to the tail of the regulator, in order to prevent the " pins becoming deteriorated by striking against the bridge of " the escapement; and, 4th, in a new arrangement of the bridge " carrying the scape wheel, which allows of its being on a level "with the other bridges and of the same strength; this arrangement adds more solidity to and gives greater space for the working of the scape wheel."

[Printed, 1*s*. Drawings.]

### A.D. 1865, July 11.—N° 1835.

**FOTHERGILL, BENJAMIN.**—(*Letters Patent void for want of Final Specification.*)—"Improvements in regulating or controlling the power employed in actuating sewing and other machines of a light nature."

The driving power of watchmakers' lathes may be regulated (according to the work to be done) by means of this invention.

The motive power preferred is "a train of toothed wheels, and the well-known 'fusee' arrangement, set in motion either by means of a barrel spring, or by a weight and cord;" when a weight is used, the "fusee" will not be required.

The invention consists in the application "of a self-acting speed regulator or governor" in combination with the above-described driving mechanism. A set of two or more vanes rotate at a high velocity, and thus "meet with sufficient resistance from the atmosphere to check or control the working of the machine." These vanes are "constructed in the form of louvre boards" so as "to open or close more or less, or they may be simple flat discs or surfaces, which are turned more or less edgewise to the resisting medium;" by these means of opening or turning more or less, a self-acting adjustment of the vanes is obtained. The vanes "may either revolve in free air or be enclosed within a box or casing, filled or partially filled with water or other liquid medium of a denser nature than the atmosphere. The opening and closing of the louvre boards, or the varying of the angle of the flat surfaces or discs, may be effected by the action of centrifugal force so applied that when revolving at a high velocity the vanes shall be closed or turned with the flat faces more or less to the resisting medium, and vice versa."

[Printed, 4*d*. No Drawings.]

### A.D. 1865, September 4.—N° 2274.

**BROOMAN, RICHARD ARCHIBALD.**—(*A communication from Robert Theurer, senior, and Robert Theurer, junior.*)—"An improved method of winding up watches and other timekeepers."

"This invention consists in winding up watches and other " timekeepers by simply opening and closing the case. Thus, for " example, by opening and closing the case five times the watch " will be wound for twenty-four hours, ten times for forty-eight " hours, and even for eight days by opening and closing the case " forty times. The opening and closing may be effected indefi- " nitely without injury or inconvenience to the watch.

"The invention is applicable to all watches, but more especially " to those in which the hinge of the case is in five parts. The " central part forms a lever, which comes in contact with the " outer end of a rod fixed to a plate supported by the ratchet " wheel, and movable upon the pivot of the axis of the barrel. " These parts produce an oscillating motion, which by means of " two pauls drives round the barrel, and consequently winds up " the watch.

"To avoid too great tension of the spring from too fre- " quently opening and closing the case, a Philippe spring" "is " used to throw off the winding gear when the watch is fully " wound."

To move the pointers, a pinion is fitted to the rod of the "secret," which on being drawn outwards puts this pinion in gear with a wheel, which transmits the movement to the pointers.

[Printed, 8*d*. Drawing.]

## A.D. 1865, September 11.—N° 2330.

KEYS, David.—" Improvements in watches, and in the method " of and apparatus for winding up fusee watches and pocket " chronometers, and setting the hands without a key."

1st. The pendant axis carries a contrate wheel "in gear with an " outside spur wheel mounted on two levers." The upper lever gears the said spur wheel with the winding mechanism; the lower lever brings a pinion (pivoted on one of the arms of the lever) into action with the minute wheel. The pinion is in gear with the outside wheel, except during the act of winding up. The outside wheel being always kept back from the fusee wheel, when the said outside wheel is turned the wrong way, it takes the pinion away from a fixed pin, "and when turned the right way the pinion " becomes fixed until the outside wheel is in gear with the fuzee " wheel." To set the hands, a push pin brings the pinion into gear with the minute wheel.

2nd. In a second improvement, the contrate wheel and the outside wheel are nearly as described above. When the outside wheel is turned the wrong way, it is brought into gear by a lever, "with " a wheel fixed on the fuzee; this lever is provided with a small " catch taking into the great wheel. In turning to the right for " winding, this catch presses the great wheel forward, and keeps " the watch going during the rotation of the wheel on the fusee " axis in winding up by the gearing therewith of the outside " wheel before mentioned." "The hands are set the same as in " the above."

3rd. In an arrangement of the independent seconds work of watches, the inventor employs "a wheel and pinion acting on an " arbor carrying a hand, which is connected by a spiral spring " and disconnected by another spring and leverage work."

[Printed, 10*d*. Drawing.]

### A.D. 1865, October 9.—Nº 2599.

**MILES, Thomas**.—(*Provisional protection only.*)—" Improve- " ments in the manufacture of scent and smelling bottles."

"The invention is chiefly applicable to union bottles, or those " bottles which are divided in the middle transversely by a double " bottom so as to contain smelling salts at one end and scent at " the other, there being a stopper at each end."

" Now the improvements consist in the construction and appli- " cation to the opening caps of the stoppers of a receptacle for the " purpose of containing the movements and dial of a watch, or a " locket, or for containing lozenges, or a sponge saturated with " aromatic vinegar or otherwise. In order to accomplish these " results, the caps of the stoppers are extended and enlarged by " the application o 'cases similar to those containing the works " and dial of a watch, having hinged spring lids which fly open " upon the pressure of the thumb or finger on the catch. The " watch case is attached to the stopper by means of a male and " female screw, in order that when removed it may expose the " winding up and time adjusting shaft heads. The entire cap " opens in the usual manner to expose the stopper by a projection " pressed in by the thumb or finger. The case at the other end " of the bottle unscrews in one entire piece from the metallic " male screw attached to the neck of the bottle and surrounding " the stopper of the smelling salts; the cap of the lozenge or

" vinaigrette case opens by a spring, or it may be fastened by a " screw."

[Printed, 4d. No Drawings.]

### A.D. 1865, November 8.—N° 2887.

**LASSUS, Joseph Bernard Oscar.**—(*Provisional protection only.*)—" Improvements in the means of renewing the teeth of " worn-out files."

" My invention relates to improvements in renewing the teeth " of files, particularly those used for cutting saw teeth, and in the " manufacture of clocks and watches. In order to remove the " rust before commencing the operation the files should be dipped " for about four minutes in a mixture composed of three parts of " water to one part of muriatic acid. I then wash the files to re- " move all extraneous matters, using a brush or card surface of " steel wire, after which I lay the files flat in a vessel of unglazed " earthenware. I next calculate the exact quantity of fresh water " required to cover them, and then add thereto a fourteenth part " of nitric acid." " The files are allowed to remain in this mix- " ture for about twenty-five minutes, after which they are with- " drawn and plunged into a vessel containing a mixture of from " three to four ounces of pure nitric acid and about one-third of " an ounce of ammonia, the files are to remain in this mixture " for about two minutes, after which they are dipped in fresh " water and brushed when cooled; the files are then fit for use."

[Printed, 4d. No Drawings.]

### A.D. 1865, November 11.—N° 2899.

**CARDEN, Henry Carnegie.**—" An improved metronome or " apparatus for measuring intervals of time."

This invention " consists in a novel combination of mechanism " applied to the construction of the instruments known as " 'metronomes,' or apparatus for measuring intervals of time, " and especially intended to mark at will in music the time of " those notes only which are naturally accentuated."

The drawings show a clock mechanism for actuating a pendulum, consisting of spring barrel, intermediate wheels and pinions, escape wheel, anchor, fork, and pendulum. On the escape-wheel axis, but separate from the escape wheel, a ratchet wheel is mounted; the said ratchet wheel has " nine teeth and nine spaces," and has a rocking lever working against it, the said lever being rocked to and fro by the teeth and spaces of the ratchet wheel. Thus, a thread secured to the lower extremity of the rocking lever actuates the indicator of an index plate which may be placed in any desired position. The "indicator" is "formed of any suit-" able light material (such as the barb of a feather)," the stalk of which passes into a helical spring,

By slight modifications, the above-described mechanism "may " be applied to the construction of alarm clocks and other instru-" ments for the measurement of intervals of time."

[Printed, 8*d*. Drawings.]

### A.D. 1865, December 14.—N° 3230.

**GUYE, August.**—"Improved mechanism for winding keyless " watches."

The objects of this invention are "to afford great facility for " removing the movement from the case and replacing it," also to effect great economy and simplicity of construction.

"To effect these objects a short rod of steel or other suitable " metal is passed through a hole made for that purpose in the " centre of the pendant. To the outer end of this rod is adapted " a milled head for actuating (by the finger and thumb) the " winding apparatus. The other end of this rod, which is inside " the watch case (and which may be of larger diameter than that " part which passes through the pendant and furnished with a " shoulder to prevent it from being withdrawn outwards) fits on " to the head of a shaft carrying a pinion, which communicates " motion to a wheel on the spring axle, so that on turning the " shaft or rod passing through the pendant by means of the " milled head this will communicate motion to the pinion shaft " in the same direction, and by that means through the gearing " wind up the spring."

The drawing shows the connection between the steel rod and the pinion shaft "as being effected by means of a nick after the " manner of a screw and screwdriver," but "any other arrange-" ment (a square and socket, for instance,) which will allow of " their easy connection and disconnection may be adopted." The pinion shaft "is supported by a bridle bearing," and its lower end turns in a step. A short tube is fitted on to the rod "to open the " locking spring when the apparatus is applied to a hunter."

*[Printed, 8d. Drawing.]*

A.D. 1865, December 16.—N° 3260. (* *)

**READE, Cecil Loftus Wellesley.**—(*Provisional protection only.*)—"Improvements in obtaining motive power applicable to " various useful purposes."

"This invention relates to certain improvements in obtaining " motive power by magnetism or gravitation, or both combined, " applicable to various useful purposes, including magnetic or elec" tric clocks. I propose to construct an iron wheel with radial " spokes and central box or hub, which is to be set on a shaft " supported by standards or bearings; on the circumference or " outer periphery of this wheel I apply eight or more tangential " hammers or armatures; they are attached by hinges and are in " the forms of arcs to correspond with the periphery of the wheel. " Thus, in whatever position the wheel is placed, it will follow " that all the armatures above the level of a horizontal line drawn " through the diameter of the wheel will be closed or concentric " with the circumference, while the others will be open or in an " outward or extended position, thus creating a leverage and " causing the wheel to be out of equilibrium, that side of the " wheel on which the hammers or armatures are extended will be " borne down, thus bringing over the successive armatures, and " creating a continuous rotary motion, while the ascending arma" tures will fall against the opposite side of the wheel, and not " exercise any counteracting leverage to the descending series. " The foregoing is an example of the power of gravitation, but " where I desire to aid the motion by electricity or magnetism, I " propose to apply a series of electro-magnets around and outside " the wheel and armatures, whereby the armatures will succes" sively be attracted during the revolution of the wheel, and thus " create a continuous motive power. By an application of clock" work movement the speed of the wheel may be easily regulated, " and thus the power obtained may be made applicable to time" keepers."

[Printed, 4*d*. No Drawings.]

A.D. 1865, December 23.—N° 3334.

**HURN, George, and HURN, Daniel.**—"Improvements in " obtaining and employing continuous lengths of tanned leather " for various useful purposes."

Clock lines are mentioned amongst other applications of this invention.

The invention "consists in obtaining and employing con-
" tinuous lengths of leather out of tanned skins or hides in one
" piece, of an oval or helical form, cut to or from the centre of
" the said skin or hide into strips or bands in lengths varying
" from one hundred to two thousand feet or more, and subse-
" quently passing the same through dies for rounding or other-
" wise forming them into strips, threads, bands, or otherwise."

"Having selected the prepared skin or hide, and pared or
" rounded off the edges or corners, the continuous lengths are
" cut therefrom by causing the knife or instrument to traverse
" the entire surface of the skin, so as to divide it in an endless
" piece or coil, which is subsequently submitted to a longitudinal
" stretching, damping, greasing, or hammering as may be found
" necessary for straightening or removing the angles and curves
" formed by the cutting."

This invention is perfectly distinct from the process hitherto used of running hides "into strips or lengths by traversing the
" hide concentrically against a stationary knife or cutter, in which
" case the operation admits only of being conducted within certain
" limits." The improved process admits of the strips being of greater width and length; endless bands may be produced by simply paring away the rough edges of the hides and subsequently reducing the whole of the same into the said bands as above described.

[Printed, 8*d*. Drawing.]

## 1866.

### A.D. 1866, January 15.—N° 136. (* *)

NEWTON, ALFRED VINCENT.—(*A communication from Max Levin.*)—"Improvements in the construction of electric clocks."

In electric clocks made according to this invention, "the
" seconds wheel is caused to act upon the minute wheel without
" any intermediate train of gearing."

In a balance-wheel clock, "the balance-wheel arbor is fitted
" *with a* cam which at every forward vibration of the balance

"wheel" brings two springs together, and thus completes the electric circuit. The spring armature "of the electro-magnets is "jointed to a rocking arm which carries a clutch that embraces "the seconds wheel and is intended to move it round tooth by "tooth. On the arbor of this wheel is a snail cam which bears "upon the end of a rocking lever having jointed to its other end "a ratchet tooth," which drives the minute wheel round one tooth for every complete rotation of the seconds wheel. When the snail cam has driven the rocking lever to the extremity of its arc of motion, the spring of the said rocking lever forces it back and the minute wheel is, in consequence, driven round one tooth. To set the clock in action it is only necessary to start the balance wheel.

In a half-seconds pendulum clock, a metal arm on the pendulum has a pin which (by striking an impulse spring as the pendulum vibrates) completes the circuit, and thus actuates a jointed rocking lever to work the minute wheel, as in the balance-wheel arrangement, the upper end of the rocking lever bearing upon a snail cam on the seconds-wheel axis.

In a seconds pendulum clock, the pendulum sets in action "an "escapement lever," which works into a seconds wheel that operates the minute wheel as described above. A bell-crank lever, connected with the armature, impels the pendulum.

[Printed, 1*s.* 2*d.* Drawings.]

### A.D. 1866, January 17.—N° 164.

ABENHEIM, Henry, ABENHEIM, Emil, and ABENHEIM, Leopold.—(*A communication from Johannes Bürk.*)—(*Provisional protection only.*)—"An improved construction of watch or time-"keeper for watchmen."

By this invention tell-tale clocks at each station may be dispensed with; in lieu thereof a key at each station acts on a watch carried by the watchman.

The said watch has an ordinary movement but only an hour hand. "A light metal ring or wheel, provided at its centre with "a square socket to fit the head of the hour hand spindle, is "adapted to the latter, and in order that it may be carried round "with the hour hand a notch is made in the boss of the wheel to "fit over the hand. The periphery of the metal wheel is grooved "all round, and on it is secured a band of paper divided by lines

" into hours and spaces of ten minutes. To the inside of the " case which encloses the timekeeper are secured any number of " spring levers corresponding in number to the number of stations " intended to be visited. The spring levers are provided at their " outer ends with pointed studs, which stand immediately oppo- " site to the divisions on the slip of paper which is attached to " the rotating tell-tale wheel. These spring levers can only be " acted on by the keys which are kept chained up at the several " stations."

"There is nothing new in the construction of the key."

[Printed, 4*d*. No Drawings.]

### A.D. 1866, January 23.—Nº 220.

**BROOKES, WILLIAM.**—(*A communication from Henry Smith.*) —"Improvements in the mode of producing mechanical motion."

Amongst other purposes, this invention is "applicable to " clocks, watches, musical instruments, and automatical sewing " machines."

1st. "A new method of producing a regularly increasing or " decreasing intermittent or other rotary motion." "In lieu of " an ordinary gear wheel there is used one the teeth of which are " formed or wound in the form of a spiral or volute. With this " volute or scroll gear a pinion is made to engage, and power can " be applied either to teeth formed on the periphery of the volute " gear or to the spirally arranged teeth of the volute gear itself, " the pinion that engages with the teeth of the latter being " necessarily susceptible of such a motion as will allow the said " pinion to both approach to and recede from the centre of the " scroll rack." This part of the invention is the foundation of the subsequent parts.

2nd. "The application of the foregoing described apparatus " to window shades for the purpose of operating them."

3rd. "An apparatus similar to the above described applied to " window sashes for the purpose of operating them."

In the 2nd and 3rd improvements, the leverage afforded by the volute gear and its pinion exactly counterbalances the power of the spring, "so that the force exerted by the latter, instead of " being as in ordinary cases variable, is always and uniformly " the same."

[Printed, 1*s*. 2*d*. Drawings.]

### A.D. 1866, February 22.—N° 549. (* *)

**BRIGHT, Henry.**—"Improvements in electric clocks."

"The rod of the pendulum at its upper end is suspended in the " usual manner, and at its lower end it carries a reel or bobbin " wound with insulated wire in the ordinary manner. There are " also two fixed permanent magnets with their like poles opposite " to each other, over which the hollow bobbin or reel passes in the " swing of the pendulum." "Above the pendulum there is a " break or contact maker which is capable of swinging freely on " its own axis, which is in the same plane with but above the " point of suspension of the pendulum. The break consists of a " narrow strip of copper or other metal which is bent in the centre " of its length into two similar limbs, and the two limbs are again " bent towards each other, so that their lower ends are opposite " each other and only at a short distance apart. The lower ends " of the two limbs are on the two sides of the rod of the pendu- " lum, but at a short distance when the pendulum hangs " perpendicularly." The axis of the break is insulated, and to the upper part of the bend in the copper strip, "is applied " a screw or stem which carries a counterbalance weight, the " position of which is capable of being adjusted." By this means the pendulum is made to drive the clock, through suitable gearing, as well as to make the requisite breaks and contacts. During each double oscillation a current is sent through the coil; if necessary, however, an impulse can be given both ways, by reversing the current at each vibration of the pendulum. Means of employing this arrangement to regulate other clocks are also set forth.

The contact maker is the chief feature of the invention.

[Printed, 8*d*. Drawing.]

### A.D. 1866, March 1.—N° 622.

**POWELL, Charles.**—"Improvements in watches and other " timekeepers."

1st. Watches that "go for a long time with once winding up" have a long mainspring of a peculiar construction. The mainspring is fitted in a cavity which extends from the edge of the plate of the watch to a little beyond the centre thereof. A train of wheels is also fitted into another cavity in the said plate; "a "supplementary wheel" is added, "to increase the duration of "the going power." An extra wheel is used "for connecting the "minute and hour wheel with the train of wheels."

2nd. To regulate the outer end of the above-described mainspring, a bolt is fitted into "a semicircular groove, the ends of "which open into the space bored out for the mainspring." One end of the bolt has a catch on which the mainspring is fitted. "As the spring is wound towards the centre or arbor the semi-"circular bolt moves towards the centre also." A straight sliding bolt, placed tangentially to the periphery of the mainspring cavity may be used for the above-described purpose.

3rd. A chronometer escapement, set forth only in the Provisional Specification.—A spring keeps "the lever in a line with "the balance axle when not acted upon by a pallet or pin of the "roller." On the roller of the balance is a pin, which, when the balance is set in motion, strikes a step on the lever, "and lifts "the pallet from the 'scape wheel, this wheel being free one of "its teeth strikes a peg or tooth in the larger part of the roller "and gives return motion to the balance."

[Printed, 6*d*. Drawing.]

### A.D. 1866, March 2.—N° 637.

**CARPENTER**, James.—"Improvements in keys for watches "and clocks, parts of which improvements are applicable to the "keys of ordinary locks."

"In lieu of the ordinary double-toothed rack formed on the "periphery of the Brequet key," and the spring in the thumb-piece, a "rack" is formed on the under surface of the thumb-piece, the pall "extending vertically from the body of the key into "the rack, and thus being concealed from view." The pall rests on the upper end of a helical spring contained in the body. "The "thumb-piece is set on a pivot in the body of the key." A plug, connected to the helical spring by means of a wire, keeps the barrel closed up when the key is not in use; this part of the invention may be used for the keys of ordinary locks.

In a modification of this invention, the before-mentioned pivot is fixed in the head or thumb-piece, and is provided with a male screw, which is screwed into the body of the key and burred; the pivot turns loosely in the screw, but has a square head that passes *through a disc*. "This disc has projecting ratchet teeth on its

" upper face gearing into corresponding recesses on the bottom of " the screw;" the helical spring "therefore forces the disc into " gear with the screw, and enables the key to be turned in one " direction," but when the head of the key is turned the other way, the oblique teeth slip over each other and depress the disc and spring.

[Printed, 6*d*. Drawing.]

### A.D. 1866, March 13.—N° 752.

**HORSTMANN, Fredrich Gustav Adolph.** — (*Provisional protection only.*)—" New or improved mechanism for obtaining " motive power, particularly applicable for the self-winding of " clocks, time-pieces, and other machinery requiring winding."

A cylinder or tube contains a metallic piston, which forms a perfect float therein. The cylinder is in connection with a vessel containing naptha, or other fluid that is expansible by heat, "oily " matter being used therewith to prevent the evaporation of the " naptha." "The alternation of temperature acting upon this " fluid causes the same to expand or contract, as the case may be, " thereby causing the piston or floating bucket to rise and fall, " thus producing an impulse or motion either in a horizontal or " vertical direction." To the rod of the piston is attached a cross bar, which causes a drum "to revolve and carry an endless chain, " by preference formed of watch spring, this chain is passed over " the main wheel arbor or barrel of the clock so that it hangs in " a loop on either side thereof," and, to each of these loops, the inventor attaches "a weight for giving the necessary working " power to the clock and setting in motion the train of wheel- " work, and thus rendering the process of winding unneces- " sary. The rack of the aforesaid piston or floating bucket is made " to work immediately upon a wheel in connection with a set " of wheels, pinions, springs, and drums, thereby rendering " the endless chain unnecessary when applied to time pieces or " mechanism of smaller construction."

The drawings show this invention applied to a clock.

[Printed, 8*d*. Drawing.]

### A.D. 1866, March 24.—N° 870. (* *)

**STIEFFEL, Philip.** — (*Provisional protection only.*) — " An " improved fly for moderating or regulating the movements of

" wheelwork." The invention is "adaptable to apparatus for " telegraph printing, for clocks, lamps, or other purposes where " wheelwork is used." "For the better and more easy compre- " hension" of this invention it is described "as applied to " a musical snuff box." The fly wheel of the box is removed, and a fly is introduced, "which is a broad riband of tempered " steel or other suitable elastic material wound on and round " a wooden cylinder, the fly having a projecting or partly turned- " up end." The axle of the cylinder is supported by plates, and on the upper end thereof "is an endless screw into which gears " one of the wheels of the movement, with which the fly is thus " placed in connection." In some cases the endless screw in the axle is dispensed with, and a cog wheel or pulley is substituted " to effect the object for which the screw is used." When it is desirable to vary the pressure of the fly, the riband is partly enclosed in the cylinder, "which for such purpose is made hollow, " having a slot cut in its periphery of the length of the breadth " of the riband;" and "by drawing out a part of the reserve the " resistance of the fly to the air or fluid (the fly working in either) " will be increased."

[Printed, 4*d*. No Drawings.]

A.D. 1866, March 24.—N° 881.

**ADAMS**, THOMAS.—(*Provisional protection only*.)—" Improve- " ments in watch and chronometer cases."

The object of these improvements "is so to construct the parts " that when the covers are applied they not only exclude air and " dust, but are rendered fluid-tight and moisture proof. For this " purpose, according to one mode of carrying out" the said improvements, "the jointing of the covers to the body of the " case is dispensed with, the parts which come together being " formed with accurately fitting surfaces. The covers are attached " to the body of the case by a mechanical adaptation and arrange- " ment of the parts known as a 'bayonet joint,' so that when " the front or back cover is placed in position and a partial " rotation given thereto the cover will be drawn tightly to the " body by means of inclined surfaces formed on one of the parts, " or one of the parts may be formed with curved recesses to " receive inclined projections or bolts upon the other part, the

" inclined projections being caused to enter the channels or " recesses by giving a partial rotation to one of the parts."

In some cases the inventor interposes "between the surfaces of " the covers and cases which come together a ring of india- " rubber (rendered permanently elastic, as is well understood) or " other suitable elastic or flexible material, thus rendering cases " so constructed air and water tight."

[Printed, 4*d*. No Drawings.]

### A.D. 1866, April 21.—N° 1127.

**JEWSBURY**, Joseph.—(*Provisional protection only.*)—"An " improved portable sun dial."

The said sun dial is also "a pocket timekeeper." The dial consists of a flat circular metallic disc, upon the face of which are shown the hours and their subdivisions, arranged in two segments of a circle, the morning hours in the upper segment and the evening hours in the lower segment; the months are also shown, arranged in another segment. An oscillating arm works upon a pin, and has "a pendant finger" suspended loosely at its free end; "when the dial is held in the position hereinafter ex- " plained its point will indicate the morning or evening hours." Opposite the said pin is placed a fixed stud or gnomon. "The " said oscillating arm has in a convenient position between its " fixed and its free end a curved point which travels over the " segment of the circle upon which the months of the year are " inscribed. When it is desired to know the hour of the day the " curved point just described is placed exactly over the proper " month or subdivision of the month;" the dial is then held so that the shadow of the top of the gnomon falls along a "shadow " line." The point of the pendant finger will then give the correct time. "The dial will also show the time of the sun's " rising and setting in manner following:—The dial being set at " the correct month or subdivision of the month, is held in such " a position that the pendant finger may cover one of the hour " lines marked on the dial, or lie parallel between any two of " them. The hour marked upon the upper segment will be the " time of the sun's rising, and that marked upon the lower " segment that of its setting."

[Printed, 4*d*. No Drawings.]

### A.D. 1866, April 21.—Nº 1128.

**MACINTOSH, John, and BOGGETT, William.**—" Improve-
" ments in guards for pocket-books, watches, and watch keys."

This invention " consists in the use of elastic cords or such " like materials to prevent pocket-books being lost or mislaid, " watches being stolen from the person, and in protecting the " interior of watches from the injury caused by dirt and dust " in the pipes of watch keys."

To prevent watches from being stolen, one end of an elastic cord is fastened " to a piece of metal of any convenient shape," " which has a sharp-pointed spiral wire, like a corkscrew, pro-" jecting from its lower end; this being screwed into the lining " of the watch pocket holds it securely, whilst the other end of " the cord is attached to that part of the watch pendant below " the bow."

To exclude dirt from watch keys, a key has a sliding metal plug accurately fitting the pipe; this plug is attached to a helical spring in the pipe. The plug can thus recede, and, when not in use, becomes flush with the end.

According to another method, pieces of thin sheet metal are cut into the form of a cross, " and are then by proper tools, such " as are used in making percussion caps, formed into a tube or " shield."

Another plan consists of making a portion of the bar of " Albert " chains a watch key. The key is inserted into the other hollow part of the bar, and presses against a helical spring therein, " being retained in its place by a bayonet joint."

[Printed, 6*d*. Drawing.]

### A.D. 1866, May 8.—Nº 1314.

**SNOWBALL, George.**—" Improvements in watch pendants, " which improvements are more particularly applicable to keyless " watches."

The pendant is so arranged that the bow or stem cannot be wrenched off by torsion. For this purpose the bow and knob are made " to turn on an axis, which is received in a strong socket " or neck on the case; the axis passes through this neck to the " inside and is suitably secured therein." Toothed collars, one on the knob axis, the other fixed to the case, exert a certain amount of friction on the rotation of the bow; this part of the apparatus is, virtually, a "Bréguet" key arrangement. The bow is fixed securely to the knob, either by itself passing through the knob, or by means of a strong steel screw passed through it.

In keyless watches, the knob axis "is furnished with a pinion " communicating with the winding and setting gear, which may " be of the ordinary kind."

"A further improvement in watch pendants consists in con- " structing them as before described and in fitting them to act as " the push piece for detaching the catch to open the faces of " hunting watches, or it may be the bottom of an open-faced " watch if fitted to open with a spring. For this purpose, " instead of the push piece consisting of a rod passing up the " centre of the pendant stem as usual," the invention constitutes the whole pendant the push piece, and presses it all inwards in releasing the catch of the case. "The pendant so constructed as " a push piece may rotate or not as first herein described."

[Printed, 6*d*. Drawing.]

### A.D. 1866, June 23.—N° 1679.

**BARLOW, Peter.**—"An improved method of exhibiting the " time on the dial-plates of clocks and watches."

The method of exhibiting the time to which this invention relates consists in displaying (at one time on the above-mentioned dial plates) only the figures which " denote the particular hour, " and minutes past such particular hour, if any, at which the " said figures or signs are so displayed," for instance, for half-past three, the time would be exhibited as 3·30.

Instead of "the wheels and pinions made use of for the carrying " round of the hands," the inventor substitutes a thin circular plate with figures depicted thereon; the said plate is fixed upon an axis which turns "on pivots near to where the arbor of the " centre wheel acts, the prepared side being placed in the direction " that the dial plate of a clock or watch commonly is." Two circular bands or dials are placed around the above-mentioned circular plate, "the surfaces of which" have been prepared for figures. These three dial plates "rotate by means of suitable " pinions attached to them, such pinions being connected with " the going train of the clock or watch by supplementary wheels."

The figures for the 12 hours are depicted on the prepared surface of the outer dial, "and on the prepared surfaces of the "other two dials the figures for the minutes." The dial plates are covered with "a thin shade of metal" that has "two small "open panels;" in one panel the hours are shown, in the other panel the minutes. The centre wheel acts "on a third wheel "hollow pinion, such third wheel revolving once in every five "minutes." The sudden change of the figures in the panels is accomplished by single "extra" teeth fixed to appropriate wheels.

[Printed, 8*d*. Drawing.]

### A.D. 1866, June 28.—Nº 1725.

**HUBERT, FRANÇOIS THIERRY, and TRUSCOTT, HENRY DAVID GREEN.**—"Improvements in the construction of general "electric telegraphic machines, and the mode of working them."

"These machines are for transmitting and receiving simulta-"neously with an apparatus at each end all or any number of "messages of all characters and descriptions."

"The mechanical power is an electric clock with a weight, "causing the regulating action of an horizontal metallic lever "provided with a tube containing quicksilver."

This invention relates :—

1st. To telegraphic mechanism, the accurate operation of which depends upon there being "perfect accordance between the two "connected principal instruments, although placed at distant "stations." The above-mentioned "regulating action," induced by the electric clock, is applied to change and break the circuits between the stations.

2nd. "To the employment of one or any other number of dials "which require to be oppositely screwed upon the ordinary dials "of the clocks used at any of the stations, according to the "difference of the longitudes, for the purpose of obtaining "constantly and instantaneously without any calculation the "difference of the solar time between the distant stations."

3rd. To the employment of certain "electric batteries."

4th. "To an arrangement of mechanism with its indicator or "dial specially applied to the requisite alarm instrument, either "for calling attention, giving the proper time or for any other purpose."

*[Printed, 10d. Drawing.]*

A.D. 1866, September 5.—N° 2285. (* *)

NEWTON, Alfred Vincent.—(*A communication from Ernest Van Bruyssel.*)—"Improvements in the construction of electric "clocks, and in the means employed in working the same."

This invention relates to "apparatus to be employed in con-"nection with a regulating pendulum clock for indicating simul-"taneously," at distant points, the time upon clock dials.

The arbor of the minute wheel of the regulator rotates the axis of a commutator once in two minutes; copper discs and platinum pieces (suitably insulated) in the ivory cylinder that forms the commutator axis, in connection with fixed springs surrounding the said axis, distribute the electric current in succession to the time indicators, positive and negative currents being alternately sent through the line wires.

Each time indicator consists of a clock dial and hands, fitted with spur gearing that is driven by an escape wheel and pallets, the pallets being vibrated by the alternate action of a fixed electro-magnet's poles upon a magnetic bar connected with the pallets. Thus the before-mentioned alternate currents drive the indicators.

A modification of the commutator consists of a rotating cylinder that carries distributing springs, the battery and other connections being made by the dipping of the said springs into stationary mercury cups. In the first-described commutator mercury cups are only used in connection with the copper discs.

The driving gear for working the time indicators may consist of a ratchet wheel and clicks; the rocking lever and the magnetic armature may be in one piece; and, lastly, the pins of the escape wheel may project through its periphery.

Induced currents, either from coils or from magnets, may be used to work the time indicators.

[Printed, 1*s*. Drawing.]

A.D. 1866, September 13.—N° 2353.

HORSTMANN, Frederich Gustav Adolph.—"A new or "improved mode of obtaining motive power, which power can be "used for winding clocks, timepieces, and other mechanism, and "also for ventilating hot-houses, green-houses, and all buildings "where a uniform temperature is desirable."

The mode of applying this invention to clocks, timepieces, and other similar mechanism is as follows:—A cylinder carries a metallic piston which has a spring to keep it pressed close home on the fluid contained in the cylinder, the fluid being supplied from a vessel containing mercury or other expansive fluid; "the " alternation of temperature acting upon this fluid causes the " piston rod carrying a cross bar to work up and down." A chain is connected at one end to the cross bar and at the other to a hollow revolving drum "containing a strong spring for regu- " lating the back pressure of the piston;" on the outside of the drum, and in gear therewith, is a second drum wheel, over which a second endless chain is passed, "which is then passed over the " main wheel arbour of the clock, and hangs down on either side " thereof in a loop." To each loop is attached a weight, one larger than the other. When the large weight has been raised to its greatest height by the expansion of the fluid, it raises a lever, releases a catch, and leaves the spring drum to revolve alone as the piston ascends or descends; the weight is then free to descend, rendering the process of winding unnecessary.

The rack of the piston "can be made to work immediately upon " a wheel in connection with a set of wheels, pinions, springs, " and drums, thereby rendering the endless chain unnecessary."

[Printed, 8*d*. Drawing.]

A.D. 1866, September 21.—Nº 2430. (* *)

NEWTON, ALFRED VINCENT.—(*A communication from Daniel Baker Lacy, Isaac Augustus Lacy, and Thomas Thompson Lacy.*)— "An improved construction of weight."

This invention consists in the employment of the "slag" from blast furnaces in the construction of weights, such slag being run into moulds of suitable form, and the weights thus produced having incorporated with them shanks, rings, or eye bolts. These weights may be formed with an outer case of sheet iron or other suitable material, such case being first inserted into the mould and the slag then run into the case, the shank of a ring, staple, or eye bolt being placed in the upper part of the case before the slag is poured into it, and thus becoming fixed in the upper part of the weight; such shank being enlarged or furnished with prongs at its lower end, which prevent it from being withdrawn from the weight after becoming embedded therein. In cases, however, in which the weight is required to be large and heavy, the outer casing may be dispensed with, and instead of a ring, staple, or eye bolt being connected thereto in the manner described above, a long eye bolt may be passed through the weight, the lower end having a nut thereon to retain the bolt in its place.

The patentee mentions that weights, formed with cases as described above, are very suitable for window sashes, as the smooth surface thereby obtained is less liable to damage the cords in connection with them than the rough surface of an ordinary cast iron weight. Weights for clocks may also be thus formed. The patentee, however, apparently considers the chief advantage of the invention to consist in its economy, slag being, of course, cheaper than cast iron.

[Printed, 8*d*. Drawing.]

### A.D. 1866, September 22.—N° 2446.

**WEICHERT**, William.—"Improvements in the construction "and arrangement of chronometers, barometers, and thermo"meters."

This invention "consists, firstly, in causing the indication of "marks of tenths of seconds, and in the beating of half seconds "and seconds; and, secondly, in the combination with chrono"meters of a barometer and thermometer, forming one instru"ment."

"The face of the chronometer is furnished with an outer "circular indicator beyond the periphery of the ordinary 'seconds "'divisions;' this outer series is divided into six hundred parts, "giving ten divisions to each second.

"The wheelwork is also increased by extra pinions gearing "into each other in order to mark tenths and beat half seconds "and seconds; this is easily accomplished by regulating the "number of teeth relatively to each pinion."

"In the face of the chronometer below the centre a space is "cut, in which a barometer dial is inserted, having the requisite "indicators, and actuated by mercury." "The face of the "barometer also contains a small thermometer." "By these "improved arrangements observations at sea may be taken with "great accuracy."

The drawings show "the hour wheel," "the minute wheel," "the up-and-down wheel," "the pinion over the fuzee," "three "extra wheels," and an extra cock which supports one of the extra wheels. "The seconds are carried from the third wheel. "By these arrangements the teeth of the train of wheels being

" proportionately varied a quick train will be produced, and it " will distinctly shew tenths of seconds. The chronometer con- " bining the three instruments may also be made to beat half " seconds, if preferred."

[Printed, 8*d*. Drawing.]

### A.D. 1866, September 24.—N° 2447.

**HERRMANN, Ignaz.**—(*Provisional protection only.*)—" Im- " provements in chronometers or other timekeepers."

This invention relates to improvements in the escapement, " whereby the balance receives its impulse from suitable mecha- " nism." In this invention, the impulse to the balance wheel is not given by the mainspring, but by a certain arrangement of " spring detent or hammer."

The escape wheel has two sets of teeth; one set (those that are upright), at a suitable time, act upon the inclined face of a blade spring so as to enable it, after being raised by such action, to impel the balance; the other set are, also at a suitable time, acted upon by detaining pallets that are worked by a small roller on the balance axis, the step of which raises a spring lever (centred on the pallet axis) against the force of a fixed reaction spring that presses upon the tail of the said spring lever. The said blade spring has an arm projecting therefrom, which either gives impulse to the step of a second and larger roller on the balance axis, or receives momentum from it, according to the direction of motion of the said balance axis, and according to whether it is raised from its normal position or is about being raised from the same.

The spring lever on the pallet axis also is enabled, by means of its fixed reaction spring, to give impulse to the balance axis by its pressure upon the inclined step of the small roller after it has been risen up by the same.

" By this arrangement the balance receives equal power of " impulse by every second vibration, and any irregularity of the " main power does not reach the regulating piece or balance."

[Printed, 8*d*. Drawing.]

### A.D. 1866, October 12.—N° 2646.

**BUERK, Jacob Edward.**—(*Complete Specification, but no Letters Patent.*)—" An improved detecting apparatus for registering the " time of watchmen, mechanics, and other employés."

"The said invention consists chiefly in the combination with " the ordinary parts of a watch or clock of certain registery " devices which are operated by suitable keys to form impressions " or perforations upon dials or indexes of card, paper or other " similar material, the exact time at which each impression is " formed being shewn by figures or other characters upon the " said dial representing the hours and other usual divisions of " time."

The clock mechanism is used to operate a disc, upon the face of which is placed a recording dial having figures and divisions marked thereon. To secure connection between the dial and disc, the collar (which slips over the disc axis and thus fastens the dial) is provided with a spring catch, and has perforations corresponding to pins in the disc, and through which the said pins pass. The time is shown upon the revolving dial by a fixed pointer, "the hours being indicated by the large figures, and the " minor divisions of time by the small figures." A key, inserted on a stud, acts upon springs according to the wards of the said key; the springs, in consequence, impress the recording dial in accordance with the annular spaces on the said dial to which they correspond. A stop and shoulder prevent any one key from operating the wrong spring. The keys are fastened by chains in the different rooms to be visited, and each key operates a separate and particular spring, and therefore perforates the disc in the annular space allotted to it and no other.

[Printed, 8*d*. Drawing.]

### A.D. 1866, October 15.—N° 2665. (* *)

NEWMAN, Philip Harry.—(*Provisional protection only.*)— " Improvements in the manufacture of coloured glass windows " and other translucent surfaces." These surfaces "are also " adapted for window blinds, lamps, clock faces," and for "other " positions in which there is a light on the side opposite to that" from which the surface is viewed.

The inventor unites pieces of coloured glass to a sheet of glass (ground on one or both sides) with "silicate of potash, or it may " be gum or other substitute, it being merely for a temporary " purpose." He fills the interstices between the edges of the pieces with portland or like cement, and then applies "the facing " glass having the opaque ornamenting colours which correspond

" in such manner with the design of the coloured glass that the " opaque ornamentation obscures the junctions." He finally cements the surfaces together near the edges only, or at intervals, or " over the entire surface, if a transparent adhesive material is " used."

[Printed, 4*d.* No Drawings.]

A.D. 1866, November 17.—N° 3023.

**GEDGE, William Edward.**—(*A communication from Edouard Néel.*) — " Certain improvements applied to clocks and to the " receiving apparatus of telegraphs."

The inventor replaces the hands or indexes of the above apparatus " after the following manner :—Firstly, the mechanism of " the clock (or telegraphic apparatus) is not changed, but as many " moveable dials are fitted as there are indications to be given, " two, if it is desired to have only the hours and the minutes, or " three or a greater number, according to the indications required " from the clock or chronometer; secondly, this moveable dial is " placed on the axle of the wheel of the hours, minutes, and " seconds, in such a way that the indication of the minute corresponds perfectly with the tooth which establishes this division " of the minutes; thirdly, the moveable dials are hidden by a " screen or cover, leaving visible for the hours only the hours " corresponding to the twelfth of the dial, in other words, only " one hour, one minute, or one second passes at a time."

"The clockwork which in ordinary clocks causes the hands to " travel will also advance with equal regularity, the dials placed " on the actual axle of the wheels indicating the hour, the " minute, and the second. This modification is applicable to " telegraphs," " and in this way any person can read the despatch " which is addressed to him without any special study, the letters " presenting themselves on the screen, and there being no necessity to follow the evolutions of an index."

[Printed, 1*s.* Drawings.]

A.D. 1866, November 29.—N° 3141.

**MITCHELL, Robert, junior.**—(*Provisional protection only.*) —" A revolving watch bow and pendant."

" *The object* of this invention is to prevent watches being stolen " *from the person by* twisting the bow from the pendant.

"A watch case pendant consists of two parts, the pendant "proper, which is soldered or otherwise securely fixed to the case, "and the bow which is connected with such pendant for the pur-"pose of attaching a guard or chain, by which the watch may be "suspended from the neck or other parts of the person wearing "it.

"In my invention the base of the pendant which is fastened to "the watch consists of a tube about a quarter of an inch long "(according to the size of the watch) into which the push is "fastened with a pin. The bow is fastened to a larger tube "which is fitted over the smaller one, and fastened at the top "by a collet in such a manner that the larger tube with the bow "can revolve freely on the smaller one. By thus making the "bow to revolve there is no resistance offered to the twist of the "thief, and instead of breaking off, as is now the case, the bow "merely turns round. Thus it would be impossible to steal a "watch from the person without having recourse to such violence "as to immediately arrest the attention of the owner."

[Printed, *4d.* No Drawings.]

### A.D. 1866, December 3.—N° 3173.

CLARK, WILLIAM.—(*A communication from Joseph de Susini.*) —(*Provisional protection only.*)—"Improvements in apparatus for "applying and regulating motive power."

In the application of this invention to "toy watches," the power produced by the tension of an elastic cord is regulated by a self-acting escapement.

A projecting part of leather or india-rubber, at the centre of a lever that works on a pin, presses on the periphery of a pulley on the axis that induces tension upon the cord, the said pressure being produced by the tension of the cord itself, and being in proportion thereto. The cord is securely fixed to the axis, and is partially wound thereon by means of a key, it then passes round a grooved guide pulley that works on a separate pivot, and its outer end is fixed to the extremity of the lever. The effect of this arrangement is that when the cord is wound upon the said axis (which is the central axis of the watch, and carries the hands) it pulls down the lever with a power proportioned to its own tension, and enables a slow and regular motion to be imparted to the hands of the watch.

A cross bar, secured at each end to the watch case, has holes placed suitably to receive the bearings of the axis and of the pivot respectively.

Each end of the axis is squared, one end to receive the hands, the other end to facilitate the application of the key. The parts of the axis or spindle "immediately adjoining the squared ends " are slightly shouldered off, and in order that the spindle may " turn with as little friction as possible," a small washer of glove leather slightly greased is applied thereto.

[Printed, 6*d*. Drawing.]

### A.D. 1866, December 31.—N° 3446.

GRIFFIN, JAMES THEODORE.—(*A communication from Henry Horton.*)—" Improvements in calendar movements for clocks."

The said clocks show the day of the month, the day of the week, and the month; they make "the changes instantaneously " at midnight." The improvements are :—

1st. "The employment of a 4, 8, 12, or more year wheel," moved by a pin, controlled by a bent wire, and having eight slots, six plain, and two irregular surfaces; also the employment of a February cam constructed on the year cam disc.

2nd. The employment of a pall in contact with a stop lever, which takes into the teeth of the 31-days' wheel.

3rd. The employment of a lever cam on the 31-days' wheel to pass the stop lever over certain teeth in the said wheel, to adjust thereby the number of days in accordance with the month.

4th. The employment of a bent wire to change the length of the months in the 31-toothed wheel; this wire acts in combination with the lever cam, with cams on the year cam disc, and with projections on an eight or other year wheel.

5th. Operating the calendar by the looping of a rod about the main cam "for retaining the rod in its place, and by the combina- " tion of the main cam and rod producing the changes of the " calendar instantaneously at midnight."

6th. Attaching a tumbler to a weight lever, so as to receive the action of the main cam by the bent rod, and by a cam surface of the *tumbler*, to carry a stop lever over the teeth of the 31-days' wheel;

also the employment of a tumbler to raise a stop lever over one tooth of the 31-days' wheel and of other wheels; also raising the stop lever over the teeth acted upon by the same by means of projections on the lever cam.

7th. The arrangements and combinations of the above parts of calendar movements for clocks.

[Printed, 1*s*. Drawing.]

# APPENDIX.

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### A.D. 1767, March 13.—N° 872.

**DOWNES, John.**—" A certain instrument or tool, called a " deepening tool, on any principles or constructions whatsoever " that deepen wheels by measuring or gauging them."

In one instrument adapted to the " purpose of deepening " wheels in clock and watchwork " the tool is a kind of proportional compass, in which one pair of legs is double the length of the other pair. To find the place in one of the longer limbs " of measuring the wheel, divide the line in proportion to the " primitive wheel and pinion, and add to this the tops of the " teeth; then at the tips or points of the teeth so added is " the place of measurement for a wheel of that number, what-" ever it be." A narrow piece of brass is fixed on a portion of the said longer limb " as an index;" also a " spiral wheel " has its centre thereon. The spiral wheel is divided and numbered on its circumference " from the said places of measurement " according to the number of teeth, from twenty-four to one " hundred;" and will always, therefore, show such place of measurement in the said limb when the number is brought to the edge of the index. The diameter is then gauged from the index to the other long limb; " the distance " " at the other end " is the distance of the centers; or, in other words, will mark " off the true distance of the pivot holes, so that the wheel and " pinion will be of a right depth in each other."

Another instrument for the same purpose consists of three plates " lying one upon another." They move upon one joint and open and close at five inches distant from the centre, by means of a screw and slide. There are four notches, two for the wheel and two for the pinion. The wheel is thereby gauged, and the pinion is gauged by gauging its teeth by means of a wheel on the instrument. The said four notches are thus enabled *to give the diameter* of " the primitive wheel and primitive pinion,

" which is the thing desired," for in the middle, "the tool will " measure off the half diameter of both, or, in other words, the " distance of the pivot holes."

[Printed, 6*d*. Drawing.]

### A.D. 1844, April 18.—N° 10,151.

WOODS, JOSEPH.—(*A communication.*)—" Improvements in " regulating the power and velocity of machines for communi- " cating power."

This invention, as far as it relates to regulating the power and velocity of prime movers by means of the free conical pendulum, is referred to in No. 1230, A.D. 1865, which is in the present series of Abridgments.

The said improvements consist in employing for the above-mentioned purpose, "the differential velocity between the varying " speed of machinery driven by prime movers, and the constant " velocity of the conic revolutions or oscillations of a pendulum." The said pendulum being detached from the prime mover, and being actuated by a constant power, the number of its revolutions or oscillations in a given time will entirely depend upon its length and therefore will be invariable.

The said improvements also consist in "the application of the " nearly regular and constant velocity of a detached fly wheel, " so as to employ the differential velocity between it and the " machine" to effect the above-mentioned purpose.

The inventor states:—"From the circumstance of using a " detached instrument actuated at a certain constant speed, " independant of that of the machinery, I contemplate denomi- " nating it a 'chronometric governor.'"

In one application of this invention, the pendulum rotates freely on a universal joint, having equable motion conveyed to it by means of a curved crank in connection with weights, cords, and pulleys by means of bevil wheel gearing; the acting weight is wound up by the motive power to be governed. A shaft, connected with the said bevil wheel gearing by means of spur gear, and therefore revolving synchronously, carries an internal screw. Another shaft, driven by the prime mover, carries an external screw fitting and moving within the said internal screw. The shaft of the external screw may have longitudinal motion; this motion partakes of all the irregularities of the prime mover, and is "produced by the difference of velocities" that the inventor avails himself of "to act on the setting of the valves, sluices, or "sails."

This invention also comprises certain slide valves and cams used "in combination with the aforesaid or any other governor."

The drawings show the application of this invention to an expansion steam engine, to the throttle valve of a steam engine, to a pumping engine, to a windmill, and to a water wheel or turbine.

No application of this invention to the regulation of clockwork is mentioned.

[Printed, 1*s.* 10*d.* Drawings.]

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## ERRATA IN PART I.

Since the publication of the first volume of the present series of Abridgments, the following errata have been discovered therein:—

Page 2, line 14, *for* "Booth, Edward, and Houghton, William," *read* "Booth, Edward, Houghton, William, and Tompion, Thomas."

Page 2, line 28, *for* "Debanfre" *read* "Debaufre."

Page 96, line 3, *for* "Durillier" *read* "Duvillier."

Page 105, line 29, *for* "Gandibert" *read* "Gaudibert."

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CONTENTS.

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2. A Treatise of Metallica, but not that which was published by Mr. Simon Sturtevant, upon his Patent, &c. By JOHN ROVENZON. (*Letters Patent granted A.D.* 1612.) Price 4*d*: by post, 5*d.*
3. A Commission directed to Sir Richard Wynne and others to inquire upon oath whether NICHOLAS PAGE or Sir NICHOLAS HALSE was the first inventor of certaine kilnes for the drying of malt, &c. &c. (*Letters Patent, Nos.* 33 *and* 85, *respectively dated* 8*th April* 1626, *and* 23*rd July* 1635.) Price 2*d.*; by post, 3*d.*
4. DUD DUDLEY'S Metallum Martis; or iron made with pit-coale, sea-coale, &c. (*Letters Patent, Nos.* 18 *and* 117, *respectively dated* 22*nd February* 1620, *and* 2*nd May* 1638.) Price 8*d.*; by post, 9*d.*
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6. An exact and true definition of the stupendous Water-commanding Engine, invented by the Right Honourable (and deservedly to be praised and admired) EDWARD SOMERSET, Lord Marquis of WORCESTER, &c. &c. (*Stat.* 15 *Car. II. c.* 12. *A.D.* 1663.) Price 4*d.*; by post, 5*d.*
7. Navigation improved; or the art of rowing ships of all rates in calms with a more easy, swift, and steady motion than oars can. By THOMAS SAVERY. (*Letters Patent, No.* 347, *dated* 10*th January* 1696.) Price 1*s.*; by post, 1*s.* 1*d.*
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